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ABSTRACT

Part of an ongoing study to provide information for curriculum development and the institution of agricultural education programs to meet manpower demands in Montana, Phase II concerns itself with the judgments, skills, and attitudes needed to qualify for available jobs in agri-business and agricultural production. Each report is a composite of competency interviews with employers in a particular job cluster and a compilation, evaluation, and analysis of the data. In this report, requirements for entry-level employment in each of 12 job classifications in the cluster of agricultural mechanics occupations are identified and rated on a scale of relative importance, to assist prospective employees in assessing their qualifications, to aid counselors in guidance, and to provide program planners with a basis for development of curriculum materials utilizing performance objectives and for defensible training programs. (AJ)

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A study to determine

Competencies Needed by Employees Entering Agricultural Mechanics Occupations

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A STUDY TO DETERMINE COMPETENCIES NEEDED BY EMPLOYEES ENTERING AGRICULTURAL MECHANICS OCCUPATIONS

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Pages 24 and 25 - disregard pluses (+) and footnote reference

Page 38 - tend to tends

Page 96 - b - place comma after program,

Department of Agricultural and Industrial Education
Montana State University
Bozeman, Montana

A STUDY TO DETERMINE COMPETENCIES NEEDED BY EMPLOYEES ENTERING AGRICULTURAL MECHANICS OCCUPATIONS

by

Dr. Douglas D. Bishop

Dr. Max L. Amberson

Barbara E. Richardson

The work presented herein was performed by the Montana Agricultural Experiment Station and Supported by the Office of the Superintendent of Public Instruction, Vocational and Occupational Skills Component

The Montana State University
Department of Agricultural and Industrial Education
Room 313, Linfield Hall, Bozeman, Montana
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PREFACE

In the spring of 1970, the staff of the Department of Agricultural and Industrial Education of Montana State University initiated a state-wide study to determine the nature and extent of rural youth and adult education and employment opportunities associated with agri-business and agricultural production. Four reports were published during 1972 as a result of Phase I of the Agricultural Manpower Study and are available from the Office of the Superintendent of Public Instruction, Helena, Montana, 59601. The four reports are also available on micro-fiche in the library reference source, Educational Resource Information Center (ERIC), and appear as follows:

ED 069 874 - Ag-Business Manpower Project Manual

ED 069 872 - Ag-Business Manpower Project Report

ED 069 875 - Agricultural Producer's Manpower Report Manual

ED 069 873 - Agricultural Production Manpower Report

Phase II of the study concerns itself with the judgements, skills and attitudes needed by potential employees in order to qualify for available jobs in agri-business and agricultural production. This phase of the study began in the fall of 1972. The result of research conducted during this phase will be a series of reports in particular job clusters.

Each report is a composite of competency interviews and a compilation, evaluation and analysis of the data. A section on research methodology is also included.

This report is in keeping with the major objective of the study which is to provide essential information for curriculum development and ultimately the institution of agricultural education programs to meet manpower demands for agriculture in Montana.

ACKNOWLEDGMENTS

This statewide survey of competencies deemed necessary to employees in (agri-business) machinery dealerships was made possible through support from the Montana State Agricultural Experiment Station and the Montana Office of the Superintendent of Public Instruction.

The research effort was planned and carried out by the Montana State University Agricultural and Industrial Education Department with the cooperation of the Director of Vocational and Occupational Skills, Helena, Montana.

Special acknowledgment is extended to the staff members from the Vocational and Occupational Skills Component and the Research, Planning, Development and Evaluation Component of the Office of the Superintendent of Public Instruction. The Montana Chamber of Commerce lent invaluable support to the project.

Special appreciation is extended to the Montana Hardware Dealer's Association, staff members of the Helena Vocational-Technical Center, Montana State University Department of Commerce, Dorn and Gallatin Equipment Companies of Bozeman and the Owenhouse Hardware of Bozeman for their assistance in developing and validating the instruments used throughout the survey.

The authors wish to express thanks to the Montana Vocational Agricultural teachers and other personnel who served as interviewers, to those businessmen and employees who supplied data, and to Mrs. Erma Belden for her assistance in the preparation of the report.

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SUMMARY

Purpose and Objectives

The purpose of this survey was to determine the skills, attitudes and knowledge required for successful employment in twelve job titles in an agricultural machinery business. Specific objectives of the study were:

1. To identify the skills, attitudes and knowledge requirements for entry-level employment in each of twelve job classifications.
2. To rate each competency on a scale of relative importance.

Methods and Procedures

During the Spring of 1971, the Montana State University Department of Agricultural Education in cooperation with the Superintendent of Public Instruction and the Montana Agricultural Experiment Station began a long-range agricultural manpower project. Phase I-A of the research project involved a determination of the extent and nature of agri-business employment opportunities in Montana.

Phase II-A of the manpower project was begun in the Fall of 1972. A list of competencies was drawn up for each job title within an agricultural machinery business. The lists of competencies were written by the research staff with assistance from knowledgeable people in the field. These lists of competencies were validated by people in agricultural machinery businesses in the Bozeman area and instructors at the Helena Vocational-Technical Center.

With exception of two, the survey population of forty was chosen from businesses who responded to Phase I-A of the manpower project. The farm machinery dealerships chosen to participate in the survey had four or more employees and were not involved in the validation of the competencies. The two businesses that were selected for Phase II-A and not contacted in Phase I-A were chosen on the basis of locality.

Thirty-seven interviewers were trained to call on the group of agricultural machinery business respondents. Twenty-seven of the interviewers were vocational agriculture teachers and ten were interviewers with previous experience. The interviewer asked the respondent to give each competency a rating of 1 to 5 and the rating was recorded on the rating sheet by the interviewer. The data obtained by the end of the fifth week were coded and keypunched.

The data were run on a modified computer program which provided a printout of each competency statement with its accompanying mean, median, standard deviation and frequency. In addition a weighted score was calculated for each competency. The resulting weighted scores were rank ordered for all competencies for each of the twelve job titles. Comparison tables of ratings given by the employee and others were prepared for ten job titles. Two job titles, manager and painter, were rated by the employee only; therefore, there were no comparisons.

The data were analyzed and a comparison was made between the competencies falling into the top 25 percent as rated by the employees and as rated by others. A further determination was made as to the extent of agreement in the bottom 25 percent. The top and bottom 25 percent were arbitrarily selected for comparison purposes and were not intended to eliminate other competencies when developing curricula.

General Conclusions

1. The competencies which the respondents were asked to rate did include the bulk of the tasks which employees in Montana Farm Machinery Dealerships are asked to perform as a part of their job.
2. The employee respondents and other respondents held a divergence of opinion as to the relative value of a large number of the competencies identified with each job title.
3. There was less difference of opinion among all respondents regarding the relative value of those competencies requiring a high level of mechanical skill as opposed to those competencies which involved a large number of people-oriented skills.
4. With the exception of the setup man job title, the employee respondents and other respondents were in closer agreement on those competencies ranked in the lower 25 percent than they were on those competencies ranked in the upper 25 percent.
5. There appears to be a recognizable hierarchy of job titles within Montana farm machinery dealerships with an identifiable group of competencies generally associated with each of the job titles.
6. More emphasis should be given to developing affective type competencies when training potential managers, supervisors, salesmen and partsmen.
7. A sizeable number of the tasks relative to overhaul and repair of farm equipment which require a highly skilled, technically trained person will continue to be performed outside many farm machinery dealerships.

I

INTRODUCTION

Tremendous shifts have taken place in the agricultural industry in recent years. A broad complex of off-farm agricultural businesses and accompaning services have evolved to facilitate the work of the production farmer and rancher.

"Agri-business," is a term coined during World War II. It encompasses the commercial-industrial components in the functions of production, assembly, processing, manufacture and distribution of new products from raw materials derived wholly or in part from livestock and crops, with or without the addition of other products. Possibly the best available criterion is as follows: if knowledge and skill normally considered agricultural are essential in operation of a company, then it is considered agri-business.

During the early stages of agricultural mechanization, each farmer, with a few hand tools and a little "tinkering" could generally keep his entire complement of farm equipment operational. However, as machinery technology has advanced, the more complicated mechanical, electrical and hydraulic systems require the services of a new kind of skilled workman with specialized training. The farm mechanic entered the farm machinery industry.

Because the agricultural machinery industry has been so successful in its efforts to mechanize all aspects of farming, dealerships have

been confronted with the persistent and growing problem of maintaining staffs of skilled craftsmen who can service and/or repair the variety of machinery and equipment rolling off the industry's production line in an ever-increasing volume.

Phase I

Phase I, an Agri-Business Survey and an Agri-Producers Survey, was completed in 1972. The purpose of Phase I was to determine the current and projected manpower needs. In the Agri-Business Survey, job opportunities were classified in six areas:

1. Agricultural Supplies/Services
2. Agricultural Mechanics
3. Agricultural Products
4. Ornamental Horticulture
5. Agricultural Resources
6. Forestry

A total of 352 job vacancies was reported in 188 businesses in the six areas. These vacancies were further divided among eight job position areas identified in Phase I: managerial, supervisory, technical, sales, office, service, skilled and unskilled. Service positions vacancies led all others, with 79 openings. Vacancies in sales positions were second, with a total of 55 openings.

In Phase I, a total of 147 agri-businesses indicated the service they render related to the area of agricultural mechanics. At the time of the survey, there were 1,180 employed in the agricultural mechanics area with 101 vacancies reported. By 1975-76, it was estimated that there would be a 20 percent increase in the number of employees.

Rationale for the Study

The ultimate goal of a sound vocational educational program is to prepare employees for the world of work. It is a generally accepted fact among vocational educators that the nature of all skill training should be determined on the basis of those competencies a worker will be required to perform within a specific job or within a cluster of closely related jobs.

Well-designed curriculum materials are essential in preparing potential employees for present or future job opportunities in all areas of agri-business. To be most effective, curriculum development efforts should focus on specific occupational needs and demands within specific types of businesses. A first step in this process is the identification of needed competencies.

The vast majority of competencies essential to the successful operation of a farm machinery dealership evolves around agricultural mechanics. Therefore, this facet of the Montana Agricultural Manpower Project was instituted to determine those essential competencies that employees should demonstrate in order to enter this segment of the agri-business industry.

Assumption

It was assumed by the investigators at the beginning of the study that agri-business employees in machinery dealerships would be able to rate the relative importance of each competency within their respective job title and that businesses employing 4 or more employees would perform a large percentage of tasks identified with each of 12 job titles.

Limitations

The limitations for this project are those that are inherent with survey research utilizing an interviewer interacting with a respondent who renders a judgement as to the relative importance of each competency in a series based on his interpretation of the competency statement and his perception of the tasks he performs.

Definition of Terms

The need for a common set of acceptable job titles and competency definitions which would be meaningful to the businessman was deemed essential to the conduct of the survey. Thus, the definitions were prepared to describe 12 job titles of an agricultural machinery business to insure common understanding among the participants in the study.

Job Titles:

Manager - The person in charge of the business and its organization. In many cases he is an owner/manager.

Supervisor - A person in the business who oversees employees engaged in one or more activities. Similar titles are. Assistant Manager, Shop Foreman, Parts Manager and Service Manager.

Mechanical Technician - The person in the business who performs specialized skills. Can be designated as a Machinist or Diesel Repair Man.

Salesman - This person handles all aspects of machinery demonstration and sales.

Parts Man - This individual works in the parts department and handles all sales of parts and related activities.

Mechanic - The person who performs maintenance and repair skills. He is also referred to as the Service Technician.

Welder - The individual who performs the specialized welding skills.

Mechanic's Helper - This person performs some of the routine mechanic skills to free the Mechanic for more specialized tasks.

Clerical Worker - The person who works in the office and handles the typing and/or bookkeeping tasks of the business. May be designated as the Office Worker, Bookkeeper and/or Clerk.

Maintenance Man - The individual who keeps the showroom and yard displays in order. May also be referred to as the Delivery Man or Yard Man.

Set-Up Man - The person who unloads, uncrates and assembles the farm machinery.

Painter - This individual is responsible for painting and reconditioning the farm machinery.

General Terms:

Competency - A brief statement describing a measurable knowledge or skill which an employee within a specific job title would be expected to perform.

Employee Respondents - An employee of a Montana farm machinery dealership holding a given managerial or service job title at the time of the survey.

Farm Machinery Dealership - A retail business, the principle functions of which are sales and service of machinery and equipment used in farm and ranch operations.

Other Respondents - An employee of a Montana farm machinery dealership familiar with but not currently performing the competencies being rated for a specific job title.

Related Research

A review of research conducted in other states revealed that a number of efforts have been made to isolate competencies required by employees engaged in businesses relating to agricultural mechanics. Although one cannot isolate a single technique for identifying and subsequently measuring the importance of individual competencies to the successful performance of the worker on the job, there were a number of basic procedures that were evident in the conduct of the studies reviewed.

Most state conducting manpower studies are attempting to identify specific job titles within the agricultural mechanics businesses. Each

study reviewed had a defensible sequence of job titles from a management position to the lowest level maintenance position. Competencies were then clustered under each job title. Various ranking techniques were used to determine the extent to which one competency was more important than the other. In a few cases, an effort was made to get at the conditions under which the competency would be performed as well as the frequency that it would be performed.

Berkey and Drake's research utilizing the task analysis concept is noteworthy. The researchers conducted a detailed task analysis of nine types of ornamental horticulture businesses in New York State (1972, p.1). They sampled the employees in each type of business. Each employee was asked to provide data as to which tasks he performed and the conditions of performance.

Florida researchers are working on a similar type project in the area of horticulture. (Patterson, 1971) The initial phase of their project is a determination of need. Other phases will isolate job titles, conduct in-depth job analysis and work toward curriculum improvement.

This and other research efforts in Montana will provide data needed to apply the task analysis concept in future curriculum development efforts.

Methodology

The methodology and conduct of Phase II - A of the Agricultural Manpower Project described in this chapter was largely dictated by the central purpose, specific objectives and theoretical base established

in Chapter I. It was necessary to accomplish the following tasks in order to collect and analyze data pertaining to the study:

1. Define and sample the population for the study.
2. Develop competency statements which measure the judgements, skills and attitudes needed for entry level employment in identified job titles.
3. Arrange the competency statements into a useable and efficient form.
4. Establish a rating system which would standardize responses.
5. Develop a training plan for interviewers.
6. Validate the instrument using consultants totally familiar with the farm implement dealership.
7. Refine the competency statements and instructions as a result of the reactions and advice of the consultants and suggestions made in the training sessions.
8. Develop procedures for collecting data and prepare a letter to be sent to all prospective respondents to announce the interviewer's call. Also design a rating sheet to facilitate the collection of data.
9. Devise a coding system which would enhance the yield of information needed to meet the objectives of the project.
10. Determine a method of analysis which would yield the information necessary to assist in the establishment of agricultural education courses and curriculums.

Survey Population

A review of Phase I of the Agricultural Manpower Project revealed that, by far, the greatest number of agri-businesses indicating they performed a mechanical function were the farm machinery dealerships. A further review of agri-business manpower needs indicated there were job vacancies for persons with mechanical skills in the farm machinery dealerships. Thus, a decision was made to interview approximately 50 Montana dealers.

There are approximately 200 farm machinery dealerships in Montana. From this group, 41 dealerships were identified who hired four or more employees and who participated in Phase I of the manpower project. A representative of the Montana Implement Dealers reviewed the resultant list to eliminate any dealership which might have gone out of business since the completion of Phase I. This process yielded a total of 40 farm machinery dealerships which became the population for the survey.

An arbitrary identification number (from 01 to 40) was assigned to each business. This was for identification and coding purposes only and had nothing to do with the size of the business.

Development of Competency Statements

An initial list of competencies considered essential for 12 job titles identified within the Montana farm machinery dealerships was prepared by the research staff. The tentative list of competencies was developed following a review of other research of a similar nature, consultation with employees working in each of the 12 job titles, and managers of farm machinery dealerships. Through this process, competency statements were added, deleted, reworded and sometimes changed from one job area to a more appropriate one.

The tentative compilation of competencies was reviewed and further refined by the employer and employees in three Bozeman agricultural machinery businesses. Two instructors from the Helena Vocational-Technical Center were asked to review the competency statements for the mechanic, technician and mechanic's helper job titles.

To validate the list of competencies, selected consultants in the Bozeman area were asked to review the statements, suggest additions or deletions needed and give their opinions as to the appropriateness of competencies and the manner in which they were written. Again, the farm mechanics instructors from the Helena Vocational-Technical Center were used as consultants to validate the competencies in the mechanical areas.

The competencies were revised according to the suggestions received from the consultants. Additions, deletions, changes in wording and the appropriateness of job tasks within specific job titles were finalized.

A trial interview was conducted in an area dealership not previously involved by the researchers using the final competency package to determine the reaction of employers and employees to the interview technique, the statements and purpose of the project.

After the competency statements were validated, several different formats were considered in an effort to simplify the interview procedure. A decision was made to prepare the competencies in booklet form with each competency being assigned a different number. The competencies were printed in numerical order from number 1 through number 794. For example, competencies number 1 through 51 were assigned the manager job title, while number 325 through 534 represented competencies a mechanic would be expected to perform. No two competencies were given the same number in order to facilitate the use of the rating sheet and subsequent competency identification.

Rating System

The respondents were asked to respond to each competency by affixing a numerical value rating which ranged from 0 to 5. A rating of "5" was

to be assigned to a competency to represent essential, "4" for very important, "3" for average importance, "2" for some importance, "1" for no importance, and "0" for no response. In the case of the technician and welder, the 0 response was to be used to indicate those skills which were performed outside the dealership. In the case of these two job titles the employees were forced to rate each competency except in those cases where the task described by the competency was performed outside the dealership.

The respondents were instructed to rate each competency by telling the interviewer the number that he believed represented the importance of each competency. The interviewer would then record the response on the rating sheet by inscribing the competency number and circling the number provided to designate the value given. If a respondent could not rate the statement or did not understand the statement, the interviewer was instructed to circle 0 for no response.

Training of Interviewers

The majority of the interviewers were vocational agriculture teachers who volunteered to participate in the study. The remaining interviewers were persons that had been used on previous occasions to conduct interviews for Montana State University.

Five training sessions were conducted throughout the state at mutually convenient locations: Billings, Missoula, Miles City, Wolf Point and Great Falls. Thirty-seven interviewers were trained and given assignments.

Prior to these sessions, interviewers were sent an Interviewer's Manual. The manual was reviewed during the training session and additional

explanation was given. The other instruments were distributed and discussed and a practice session was conducted, giving the interviewers an opportunity to work with the material and to ask any questions regarding its use and administration. An example of the additional materials and the entire package was demonstrated.

Data Collection

The personal interview was deemed the most effective approach for collecting the data. Each interviewer was trained and equipped with the necessary materials needed to conduct the interview. Separate rating sheets were provided for recording each respondent's ratings for the appropriate job title (Appendix A). In order to reduce the number of rating sheets needed to complete an interview, the interviewers were instructed to use the spaces consecutively as long as the person that was being interviewed remained the same.

It was emphasized to the interviewers that they should attempt to interview the person who performed the specific job tasks. This was not possible in all businesses but was the preferred situation. Each interviewer was instructed to give each respondent an opportunity to suggest additional competencies or identify competencies in other job titles which he normally performed.

The interviewer was instructed to mail the rating sheets to the researcher using the stamped envelopes provided. He was instructed to mail in the original as soon as the interview was completed and keep the carbon copy for his own files to be mailed in at the termination of his employment. To monitor progress, contact cards were also provided to be filled out and mailed after each interview was completed (Appendix B).

A letter was sent to all respondents requesting their continued participation and cooperation in the project and explaining that an interviewer would be contacting them (Appendix C). Many interviewers related that this letter greatly facilitated their entry into the interviewing situation and enhanced the atmosphere and rapport of the interview situation.

Data Processing

The coding for key punching was done directly on the rating sheet. A columnar account of the coding details appears in Appendix D. The data were analyzed by computer. The program was designed to yield an output containing each competency along with its frequency, percentage mean, median and standard deviation.

II

ANALYSIS OF DATA

Data from 38 people or 95 percent of the sample population are included. The data were analyzed to determine how the employee, his immediate supervisor or other employees acquainted with the job title rated the importance of the competencies he performed. Whenever possible, the employee was given the opportunity to rate the competency but when not available, his supervisor or another employee familiar with the job was asked to rate the competencies each employee performed. Those persons identified as "others" in this study tended to rate the competencies lower than the employee himself. With the exception of the job titles of manager and painter, all ratings will be presented and analyzed separately.

Because of the extensive list of competencies, the narrative presentation will concentrate on a discussion of those competencies which received the highest and lowest weighted scores.

Weighted Score Comparisons

The weighted score was used as a comparative procedure to obtain some degree of objectivity among employers and employees regarding the importance of specific competencies which were identified as being common to entry level employees within a respective job titles. Thus, a low ranking should be interpreted to mean a competency is of lesser importance to the success of an entry level worker and does not mean he will not perform such a competency at some time. The competencies shown

in the respective tables are listed in descending order by use of the weighted score. In the event two or more competencies received identical weighted scores, they were listed in numerical order. No attempt was made to determine which of the competencies with like weighted scores was, in fact, most important.

The weighted score was determined by assigning a weight of 5 when a competency was rated Essential, 4 when rated Very Important, 3 when rated Average Importance, 2 when rated Some Importance, 1 when rated No Importance and 0 for No Response. As explained earlier, the ratings used were the same for all job titles except in the case of the technician and welder where a 0 rating (No Response) indicated the activity described by the competency was not performed in the farm machinery dealership but was performed in a speciality shop.

The highest weighted score was dependent upon the number of employees or others interviewed in each job title. For example, there were 36 managers who were interviewed. Thus, the highest weighted score any manager competency could receive was 180 (36 x 5 = 180). To obtain a weighted score of this magnitude, all 36 managers would have had to rate the competency as Essential. Within the manager job title, the lowest weighted score a competency could be given was 36 (36 x 1 = 36).

Mean Rating Comparisons

In addition to the weighted score, a mean rating (arithmetic average) appears with each competency. In calculating the mean, the number of 0 ratings (No Response) were not considered as having a numerical value when making the determinations. This procedure resulted in a difference

TABLE 1

SUMMARY OF RESPONSE TO AGRICULTURAL
MECHANICS COMPETENCY SURVEY

Respondent	Job Titles Being Rated											
	Manager	Supervisor	Salesman	Parts Man	Office	Technician	Mechanic	Mech. Helper	Painter	Welder	Maintenance	Set-Up
Manager	36	11	7	5	2	2	2	1	2		2	4
Supervisor		24	3	4	2	9	10	4	1	4	1	2
Salesman			24	1			1					
Parts Man			2	26								
Office					26							
Technician						7	1				1	1
Mechanic				1		1	30		3	3	2	4
Mech. Helper								7	1		1	2
Painter									2			
Welder								1		9		1
Maintenance											8	2
Set-Up								1	1			16
TOTALS	36	35	36	37	30	19	44	14	10	16	15	32

in the N value when determining the mean for certain competencies. Consequently, in a few cases the mean scores do not appear in the table in decending order as is the case with the weighted score comparison.

Nature of Respondents

Whenever possible, the employee working in a specific job title was interviewed. In those situations where it was impossible to interview the employee, the supervisor or another worker familiar with his duties was asked to rank the competencies.

Because of possible difference in the way in which the two groups of respondents might perceive the value of certain competencies, the responses of the employee respondents and the other respondents are reported separately in the tables.

Table 1 is a tabular presentation showing the total number of persons ranking the competencies identified with each job title. For eight of the twelve titles, more "employee respondents" who actually performed the job duties rated the competencies than did persons classified as "other respondents." For the mechanics helper and set-up man job titles an equal number of "other respondents" and "employee respondents" rated the competencies; fewer actual technicians and painters rated their own competencies than did "others."

A Comparison of Manager Competencies

In all cases, the managers themselves rated the competencies they performed. All 36 managers interviewed rated each of 51 different competencies. The weighted score of all competencies ranged from a high of 168 (180 possible) to a low of 113 (36 possible) while the lowest mean rating was 3.23. This would indicate that managers felt there was considerable value in being able to perform each competency included in Table 2.

TABLE 2

RANK ORDER OF MANAGER COMPETENCIES
GIVEN BY MANAGERS

Rank Order No.	Comp. No.	Manager Competencies Rated by Managers N=36	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
* 1	4.	Analyze the financial structure of the business.			1	1	7	27	4.67	168
* 2	29.	Demonstrate the ability to get along with others.				2	10	24	4.61	166
* 3	27.	Demonstrate a willingness to work.				4	9	23	4.53	163
* 4	1.	Interview and select employees.				3	13	20	4.47	161
* 5	28.	Demonstrate the ability to work on his own.			1	3	10	22	4.47	161
* 6	5.	Develop objectives for the business that can be used by management to promote business growth.			1	3	11	21	4.44	160
* 7	30.	Demonstrate the ability to project a desirable image for firm.				6	9	21	4.42	159

TABLE 2 --Continued

Rank Order No.	Comp. No.	Manager Competencies Rated by Managers N=36	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
* 8	32.	Understand customer feelings.				4	14	18	4.39	158
* 9	33.	Understand and respect the customer's point of view.	1			4	11	20	4.46	156
*10	37.	Determine business credit needs.		1	1	4	10	20	4.31	155
*11	41.	Analyze the business enterprises on cost and return basis.		1	1	4	10	20	4.31	155
*12	3.	Evaluate employee performance.			1	4	16	15	4.25	153
*13	43.	Negotiate sales contracts.				9	10	17	4.22	152
14	36.	Establish employee wages, hours and working conditions.	1	1	1	4	9	20	4.31	151
15	40.	Allocate monies in preparing working budget.	1	1	1	4	9	20	4.31	151
16	51.	Determine employee benefits.			3	6	9	18	4.17	150

TABLE 2 --Continued

Rank Order No.	Comp. No.	Manager Competencies Rated by Managers N=36	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
17	38.	Determine need for and purchase comprehensive business insurance.		1	1	6	14	14	4.08	147
18	42.	Plan business advertising.		1	1	6	14	14	4.08	147
19	22.	Compute merchandise markup.				3	7	11 15	4.06	146
20	18.	Prepare and interpret a financial statement for the business.	1	1	2	6	8	18	4.14	145
21	44.	Explain equipment warranty and guarantee provisions.	1		1	10	7	17	4.14	145
22	49.	Compute profit margins.			4	7	12	13	3.94	142
23	21.	Compute retail and labor markup.	1		1	10	11	13	4.03	141
24	47.	Analyze records of yearly sales.			1	15	6	14	3.92	141
25	48.	Determine customer buying periods.		1	2	11	8	14	3.89	140

TABLE 2 --Continued

Rank Order No.	Comp. No.	Manager Competencies Rated by Managers N=36	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
26	45.	Analyze sales reports.	1	1	4	6	9	15	3.94	138
27	50.	Interpret company policies.	1		2	10	11	12	3.94	138
28	31.	Use the telephone for business transactions.	1	1	2	9	10	13	3.91	137
29	6.	Organize a facility for effective merchandising.	1	1	4	4	16	10	3.86	135
30	35.	Identify and comply with business laws.		2	4	9	7	14	3.75	135
31	39.	Establish and enforce safety regulations.		2	4	9	7	14	3.75	135
32	46.	Estimate amount of sales.			3	13	10	10	3.75	135
33	20.	Compute merchandise markup.	2	1	1	8	14	10	3.91	133
34	7.	Manage office functions.			6	12	7	11	3.64	131
35	19.	Compute credit costs.	2	2	2	8	10	12	3.82	130
36	14.	Prepare purchase orders.		3	4	8	11	10	3.58	129

TABLE 2 --Continued

Rank Order No.	Comp. No.	Manager Competencies Rated by Managers N=36	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
37	17.	Formulate store security policies.	1	2	5	4	15	9	3.69	129
38	23.	Apply knowledge of all farm practices and products.	1		3	12	13	7	3.69	129
+ 39	12.	Assist customers in planning machinery and equipment replacement programs.	1	1	7	4	15	8	3.63	127
+ 40	15.	Prepare stock inventories.		2	6	7	13	8	3.53	127
+ 41	2.	Conduct in-service training programs for company employees.	1	2	4	9	11	9	3.60	126
+ 42	16.	Prepare sales receipts.	2	2	4	9	7	12	3.68	125
+ 43	26.	Locate sources of market information.	1	1	5	11	11	7	3.51	123
+ 44	10.	Write clear, concise letters to potential customers.	2	1	5	9	12	7	3.56	121

TABLE 2 --Continued

Rank Order No.	Comp. No.	Manager Competencies Rated by Managers N=36	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
+ 45	11.	Help customers compute costs and returns on the use of machinery and equipment.	1	2	8	6	10	9	3.46	121
+ 46	8.	Prepare clear, concise written reports.		2	8	10	8	8	3.33	120
+ 47	25.	Identify the legal responsibilities of a business serving the public.	2		7	9	11	7	3.53	120
+ 48	24.	Operate farm machinery.		1	7	17	5	6	3.22	116
+ 49	13.	Read and follow technical service manuals.		5	9	6	6	10	3.19	115
+ 50	9.	Prepare and present public presentations.	2		8	12	9	5	3.32	113
+ 51	34.	Calculate federal, state and local taxes.	1	4	9	6	7	9	3.23	113

* Competency appears on top 25 percent, both lists.
+ Competency appears on bottom 25 percent, both lists.

A careful analysis of the first 20 competencies indicated the 10 competencies receiving the highest weighted scores relate to an understanding and application of economic business principles and being able to relate to people. Evaluating worker performance, general budgeting and promotion of the business received lower weighted scores but are still among those competencies managers considered to be of great importance. The lowest mean score given to the first 20 competencies was over 4.00 on the basis of a 5 point scale and the weighted score was 145 out of a possible 180.

A Comparison of Supervisor Competencies

Twenty-four supervisors and 11 managers rated the competencies associated with the supervisor job title. There was less agreement between these two groups than will be found on most of the other job titles. Only 4 competencies appeared in the upper 25 percent of both lists. Three of the four were competencies on which both groups of respondents agreed evolved around working with people.

Five competencies appeared in the lower 25 percent on both lists. With the exception of the competencies, "perform fabrication welding" and "prepare and present public presentation," all other competencies on which both groups agree related to some aspect of record keeping. Based on the ratings of both groups, the supervisors have less need for mechanical competencies and more need for skills relating to maintaining the business.

TABLE 3

COMPARATIVE RANKING OF SUPERVISOR COMPETENCIES
GIVEN BY SUPERVISORS AND OTHERS

Comp. No.	Supervisor Competencies Rated by Supervisors N=24	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
*100.	Fill out a work order.				4	6	14	4.42	106	1
65.	Enforce company safety regulations.			2	1	8	13	4.33	104	2
67.	Prepare customer work orders.				6	5	13	4.29	103	3
64.	Interpret company policies.			1	3	9	11	4.25	102	4
61.	Organize workers for efficient job performance.			1	2	12	9	4.21	101	5
66.	Read and follow technical service manuals.			1	5	6	12	4.21	101	6
77.	Demonstrate a complete and thorough knowledge of the tasks performed by employees under his supervision.			1	4	8	11	4.21	101	7
* 60.	Assign tasks to employees.				6	10	8	4.08	98	8
* 93.	Understand human relations with fellow workers.			1	7	6	10	4.04	97	9
* 79.	Advise on service problems.	1		1	4	8	10	4.17	96	10
94.	Understand human relations with management personnel.			2	6	6	10	4.00	96	11
95.	Explain equipment warranty and guarantee provisions.		1	1	4	10	8	3.96	95	12
71.	Identify worker conflicts that might reduce production.			2	5	10	7	3.92	94	13
76.	Demonstrate a general understanding of the tasks performed by all employees under his supervision.				8	10	6	3.92	94	14
68.	Adjust employee work schedules.			1	8	8	7	3.88	93	15

Comp. No.	Supervisor Competencies Rated by Others N=11	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
* 60.	Assign tasks to employees.				1	3	7	4.55	50
94.	Understand human relations with management personnel.				2	3	6	4.36	48
95.	Explain equipment warranty and guarantee provisions.				2	3	6	4.36	48
* 79.	Advise on service problems.				1	6	4	4.27	47
* 93.	Understand human relations with fellow workers.				2	4	5	4.27	47
96.	File warranty claims.				3	2	6	4.27	47
74.	Appraise employee performance for possible discharge or disciplinary action.				3	3	5	4.18	46
*100.	Fill out a work order.			1	1	4	5	4.18	46
73.	Recommend employees for promotions and/or transfer.				3	4	4	4.09	45
76.	Demonstrate a general understanding of the tasks performed by all employees under his supervision.				3	4	4	4.09	45
86.	Formulate in-service training programs for company employees.			1	2	3	5	4.09	45
92.	Understand human relations relating to the business.				3	4	4	4.09	45
71.	Identify worker conflicts that might reduce production.				3	5	3	4.00	44
97.	Maintain shop equipment.			1	2	4	4	4.00	44
61.	Organize workers for efficient job performance.	1			1	5	4	4.30	43

TABLE 3--Continued

Comp. No.	Supervisor Competencies Rated by Supervisors N=24	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Supervisor Competencies Rated by Others N=11	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
70.	Evaluate physical layout for increased worker production.	1		1	5	9	8	4.04	93	16	69.	Rearrange facilities to improve worker efficiency.			1	2	5	3	3.91	43
92.	Understand human relations relating to the business.			2	7	7	8	3.88	93	17	70.	Evaluate physical layout for increased worker production.				4	4	3	3.91	43
99.	Write up an order.	2			5	7	10	4.23	93	18	72.	Initiate worker incentive programs.				4	4	3	3.91	43
97.	Maintain shop equipment.		1	2	4	10	7	3.83	92	19	77.	Demonstrate a complete and thorough knowledge of the tasks performed by employees under his supervision.				4	4	3	3.91	43
88.	Diagnose problems in hydraulic power transfer systems.		2	3	2	8	9	3.79	91	20	62.	Evaluate employee performance.	1			2	4	4	4.20	42
91.	Diagnose problems relating to diesel engine tune-up.		2	3	2	8	9	3.79	91	21	67.	Prepare customer work orders.			3		4	4	3.82	42
62.	Evaluate employee performance	1		2	2	15	4	3.91	90	22	99.	Write up an order.	1			2	4	4	4.20	42
69.	Rearrange facilities to improve worker efficiency.		1	1	6	11	5	3.75	90	23	63.	Estimate man-hour requirements required to complete various jobs.	1			2	5	3	4.10	41
89.	Diagnose problems in mechanical power transfer systems.		2	3	2	9	8	3.75	90	24	66.	Read and follow technical service manuals.			3	1	3	4	3.73	41
90.	Diagnose problems relating to gasoline engine tune-up.		3	2	2	9	8	3.71	89	25	75.	Maintain time and production records.			1	3	5	2	3.73	41
98.	Make out a receipt.	1	1	1	7	6	8	3.83	88	26	78.	Maintain customer service records.				6	2	3	3.73	41
63.	Estimate man hour requirements required to complete various jobs.	1		3	5	9	6	3.78	87	27	98.	Make out a receipt.	1			3	3	4	4.10	41
96.	File warranty claims.	2	1	2	3	8	8	3.91	86	28	68.	Adjust employee work schedules.			2	4	2	3	3.55	39
84.	Prepare clear, concise written reports.	1		3	6	9	5	3.70	85	29	65.	Enforce company safety regulations.	1		1	3	3	3	3.80	38

TABLE 3 --Continued

Comp. No.	Supervisor Competencies Rated by Supervisors N=24	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Supervisor Competencies Rated by Others N=11	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
78.	Maintain customer service records.	1	2	1	6	8	6	3.65	84	30	89.	Diagnose problems in mechanical power transfer systems.	1	1	1		5	3	3.80	38
74.	Appraise employee performance for possible discharge or disciplinary action.	2		3	4	10	5	3.77	83	31	80.	Prepare delivery orders	1		1	3	4	2	3.70	37
75.	Maintain time and production records.	2	2	2	3	7	8	3.77	83	32	+ 82.	Prepare a washout sheet.	1		1	4	2	3	3.70	37
72.	Initiate worker incentive programs.	1		2	11	5	5	3.57	82	33	84.	Prepare a clear, concise written report.			3	3	3	2	3.36	37
73.	Recommend employees for promotion and/or transfer.	1		3	9	6	5	3.57	82	34	+ 85.	Prepare and present public presentations.		1		5	2	3	3.55	37
86.	Formulate in-service training programs for company employees.	1	1	3	7	7	5	3.52	81	35	90.	Diagnose problems relating to gasoline engine tune-up.	1	1	1	1	4	3	3.70	37
80.	Prepare delivery orders.	1	2	3	7	6	5	3.39	78	36	64.	Interpret company policies.	1		3		5	2	3.60	36
+ 81.	Develop a system of inventory control.	2	3	3	5	5	6	3.36	74	37	+ 81.	Develop a system of inventory control.	1		2	2	5	1	3.50	35
+ 83.	Determine percent of markup, selling price and profit.	2	4	4	5	3	6	3.14	69	38	88.	Diagnose problems in hydraulic power transfer systems.	1	1	1	2	4	2	3.50	35
+ 85.	Prepare and present public presentations.	1	2	6	7	6	2	3.00	69	39	91.	Diagnose problems relating to diesel engine tune-up.	1	1	2	1	3	3	3.50	35
+ 87.	Perform fabrication welding.	2	2	2	12	3	3	3.14	69	40	+ 83.	Determine percent of markup, selling price and profit.		1	2	4	2	2	3.18	34
+ 82.	Prepare a washout sheet.	8	4	3	5	2	2	2.69	43	41	+ 87.	Perform fabrication welding.	1	2	1	4	2	1	2.90	29

* Competency appears on top 25 percent, both lists.
\+ Competency appears on bottom 25 percent, both lists.

A Comparison of Salesman Competencies

Of the 25 percent or 22 competencies ranked highest by both salesmen and others, 14 appeared in both lists. It is interesting to note that, with few exceptions, the differences of opinion occurred with those competencies that implied direct involvement with people. Both groups felt these activities were important but did not agree on the order of importance. The salesman tended to agree among themselves in that there was only 13 points difference in the weighted score from the first to last competency in the upper 25 percent.

The one competency "operate diesel engine equipment" was in the top 25 percent of the competencies as rated by the salesman. This seems out of place in that all other mechanical skill competencies of this type were rated much lower by the salesman. The other respondents rated this competency as having much less importance.

More agreement will be noted when comparing the rating of the two groups on the lower 25 percent of the competencies. Sixteen out of the last 22 competencies appeared on both lists. It appeared the salesman did not feel it was as important to understand certain crop cultural practices as the other respondents who rated his job. On the other hand, the other respondents who rated the salesman did not see quite as much value in the salesman being able to operate the equipment he was selling.

TABLE 4

COMPARATIVE RANKING OF SALESMAN COMPETENCIES
GIVEN BY SALESMEN AND OTHERS

Comp. No.	Salesman Competencies Rated by Salesmen N=24	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
*118.	Understand a "whole goods" price list.					5	19	4.79	115	1
*135.	Understand sales policies of the business.				1	5	18	4.71	113	2
*107.	Make appraisals of used machinery and equipment.					9	15	4.62	111	3
*116.	Write out a sales receipt.				1	7	16	4.62	111	4
*105.	Thoroughly understand the advantages of the company's machinery.				1	9	14	4.54	109	5
*131.	Maintain continuous contact with potential and previous customers.				1	9	14	4.54	109	6
*110.	Demonstrate the importance of personal sales traits and a pleasing personality.					13	11	4.46	107	7
138.	Fill out company invoices and sales contracts.				1	11	12	4.46	107	8
*166.	Follow up prospective sales.					13	11	4.46	107	9
170.	Explain company policy on price delivery and credit.				2	9	13	4.46	107	10
174.	Find prospective customers.				2	9	13	4.46	107	11
*186.	Make an aggressive sales presentation without being "high pressure".				3	8	13	4.42	106	12
*133.	Express himself to customers.				3	9	12	4.38	105	13

Comp. No.	Salesman Competencies Rated by Others N=12	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
*135.	Understand sales policies of the business.					4	8	4.67	56
*116.	Write out a sales receipt.				1	3	8	4.58	55
111.	Suggest a variety of ways that the customer will benefit from the sale.			1		3	8	4.50	54
*107.	Make appraisals of used machinery and equipment.			1		5	6	4.33	52
*110.	Demonstrate the importance of personal sales traits and a pleasing personality.				1	6	5	4.33	52
*125.	Classify and cope with different types of customers.			1		5	6	4.33	52
*141.	Understand the agricultural production practices of the community.			1	1	3	7	4.33	52
168.	Take telephone orders.			1	1	3	7	4.33	52
*186.	Make an aggressive sales presentation without being "high pressure".				2	4	6	4.33	52
112.	Suggest options that will create a larger sale and a more satisfied customer.				3	3	6	4.25	51
*118.	Understand a "whole goods" price list.			2		3	7	4.25	51
*131.	Maintain continuous contact with potential and previous customers.			1	1	4	6	4.25	51
*166.	Follow up prospective sales.			1	2	2	7	4.25	51

TABLE 4 --Continued

Comp. No.	Salesman Competencies Rated by Salesmen N=24	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Salesman Competencies Rated by Others N=12	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
*106.	Demonstrate to customers the characteristics and advantages of the machinery and equipment merchandised by the company.				3	10	11	4.33	104	14	*105.	Thoroughly understand the advantages of the company's machinery.			1	2	3	6	4.17	50
*125.	Classify and cope with different kinds of customers.				4	8	12	4.33	104	15	*106.	Demonstrate to customers the characteristics and advantages of the machinery and equipment merchandised by the company.			2	1	2	7	4.17	50
*141.	Understand the agricultural production practices of the community.				3	10	11	4.33	104	16	167.	Handle customer complaints.			1	2	3	6	4.17	50
*142.	Explain equipment warranty and guarantee provisions.				3	10	11	4.33	104	17	181.	Keep current with what competition is doing.			1	1	5	5	4.17	50
177.	Exhibit thoughtfulness and consideration in scheduling calls.					16	8	4.33	104	18	185.	Determine the most appropriate time to make contacts.				2	6	4	4.17	50
184.	Understand the buyer's viewpoint.				2	12	10	4.33	104	19	188.	Obtain customer support.	1				5	6	4.55	50
179.	Cope with direct product competition.				3	11	10	4.29	103	20	120.	Help customer to determine the amount of money and/or time saved by using certain equipment.				4	3	5	4.08	49
137.	Maintain sales records and accounts.			2	2	8	12	4.25	102	21	*133.	Express himself to customers.	1			1	4	6	4.45	49
147.	Operate diesel engine equipment.				4	10	10	4.25	102	22	*142.	Explain equipment warranty and guarantee provisions.		1		1	5	5	4.08	49
167.	Handle customer complaints.				2	14	8	4.25	102	23	169.	Interpret labels, tags and charts on merchandise.			1	1	6	4	4.08	49
114.	Determine and overcome major customer objections.	1			2	10	11	4.39	101	24	139.	Create new promotional techniques for increasing machinery sales.			1	2	5	4	4.00	48
130.	Complete financial arrangements for customers who purchase machinery.			1	4	8	11	4.21	101	25	140.	Use current promotional techniques for increasing machinery sales.		1	1		5	5	4.00	48

TABLE 4 --Continued

Comp. No.	Salesman Competencies Rated by Salesmen N=24	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
181.	Keep current with what competition is doing.			1	3	10	10	4.21	101	26
191.	Recognize mannerisms that may by detrimental to potential customers.				5	9	10	4.21	101	27
168.	Take telephone orders.				3	14	7	4.17	100	28
188.	Obtain customer support.				1	18	5	4.17	100	29
129.	Determine the repayment ability of the customer.			1	4	10	9	4.12	99	30
139.	Create new promotional techniques for increasing machinery sales.			1	4	10	9	4.12	99	31
165.	Compute interest costs.				5	11	8	4.12	99	32
187.	Demonstrate tactful questioning.				4	13	7	4.12	99	33
113.	Determine and overcome minor customer objections.				6	10	8	4.08	98	34
119.	Help customers to determine their machinery needs.				5	12	7	4.08	98	35
172.	Maintain sales portfolio.			1	2	15	6	4.08	98	36
178.	Tell a concise, coherent, well-organized sales story.				5	12	7	4.08	98	37
185.	Determine the most appropriate time to make contacts.			1	5	9	9	4.08	98	38
190.	Develop a plan for working territory.			1	3	13	7	4.08	98	39

Comp. No.	Salesman Competencies Rated by Others N=12	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
172.	Maintain sales portfolio.	1		1		4	6	4.36	48
174.	Find prospective customers.	1			2	3	6	4.36	48
187.	Demonstrate tactful questioning.	1				7	4	4.36	48
191.	Recognize mannerisms that may by detrimental to potential customers.				3	6	3	4.00	48
113.	Determine and overcome minor customer objections.	1			3	2	6	4.27	47
114.	Determine and overcome major customer objections.	1			3	2	6	4.27	47
170.	Explain company policy on price, delivery and credit.	1			2	4	5	4.27	47
182.	Complete weekly sales reports.				4	5	3	3.92	47
184.	Understand the buyer's viewpoint.	1			3	2	6	4.27	47
190.	Develop a plan for working territory.	1			2	4	5	4.27	47
115.	Use a variety of closing techniques.			1	5	1	5	3.83	46
121.	Help customers to determine the profit they can expect by using different equipment.	1			3	3	5	4.18	46
179.	Cope with direct product competition.		1	1	2	3	5	3.83	46
119.	Help customers to determine their machinery needs.	1		2	1	2	6	4.09	45

TABLE 4 --Continued

Comp. No.	Salesman Competencies Rated by Salesmen N=24	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
111.	Suggest a variety of ways that the customer will benefit from the sale.				7	9	8	4.04	97	40
120.	Help customers to determine the amount of money and/or time saved by using certain equipment.				6	11	7	4.04	97	41
112.	Suggest options that will create a larger sale and a more satisfied customer.				7	10	7	4.00	96	42
115.	Use a variety of closing techniques.			2	4	10	8	4.00	96	43
122.	Suggest the proper timing of the purchase so as to produce the greatest tax advantage.			2	5	8	9	4.00	96	44
127.	Determine, with the customer, the amount of credit needed.			1	3	15	5	4.00	96	45
189.	Budget time.			1	5	11	7	4.00	96	46
194.	Prepare delivery orders.			2	4	10	8	4.00	96	47
108.	Maintain appearance of the sales room and sales lot.				9	7	8	3.96	95	48
146.	Operate large gas engine equipment.				9	7	8	3.96	95	49
160.	Determine percent markup, selling price and profit.		3		1	11	9	3.96	95	50
169.	Interpret labels, tags and charts on merchandise.				6	13	5	3.96	95	51

Comp. No.	Salesman Competencies Rated by Others N=12	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
122.	Suggest the proper timing of the purchase so as to produce the greatest tax advantage.				1	4	4	3.75	45
160.	Determine percent markup, selling price and profit.			1	1	2	4	4	3.75	45
189.	Budget time.	1			1	1	5	4	4.09	45
126.	Identify and recommend sources of credit available in the community.					1	5	3	3.67	44
177.	Exhibit thoughtfulness and consideration in scheduling calls.	1			2	1	3	5	4.00	44
178.	Tell a concise, coherent, well-organized sales story.				1	2	1	4	4	3.67	44
180.	Evaluate the effect of product competition.				1	1	4	1	5	3.67	44
137.	Maintain sales records and accounts.				1	1	3	4	3	3.58	43
138.	Fill out company invoices and sales contracts.				1	1	3	4	3	3.58	43
159.	Determine cash discounts.				1	2	2	3	4	3.58	43
123.	Approach the prospect at his ranch or his place of business and make the sale there.	1			2	3	1	5	3.82	42
183.	Read and understand trade magazines.	1			2	1	5	3	3.82	42

TABLE 4 --Continued

Comp. No.	Salesman Competencies Rated by Salesmen N=24	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Salesman Competencies Rated by Others N=12	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
126.	Identify and recommend sources of credit available in the community.			1	7	9	7	3.92	94	52	127.	Determine, with the customer, the amount of credit needed.	1	1		3	4	3	3.73	41
180.	Evaluate the effect of product competition.				7	12	5	3.92	94	53	129.	Determine the repayment ability of the customer.	1		2	1	6	2	3.73	41
128.	Compute credit costs for the customer.		1	1	5	10	7	3.88	93	54	143.	Prepare expense accounts.	1		2	2	4	3	3.73	41
140.	Use current promotional techniques for increasing machinery sales.				7	13	4	3.88	93	55	108.	Maintain appearance of the sales room and sales lot.			2	6	2	2	3.33	40
193.	Compute costs and returns on the use of machinery and equipment.				8	11	5	3.88	93	56	124.	Write and submit bids.		1	3	2	3	3	3.33	40
121.	Help customers to determine the profit they can expect by using different equipment.				9	10	5	3.83	92	57	134.	Read and interpret technical service manuals.		1	2	4	2	3	3.33	40
161.	Use an adding machine.		1	2	7	6	8	3.75	90	58	151.	Discuss soil tillage and land preparation practices.	1	2	1		4	4	3.64	40
123.	Approach the prospect at his ranch or his place of business and make the sale there.		1	2	5	11	5	3.71	89	59	192.	Prepare a washout sheet.	1		3	1	4	3	3.64	40
143.	Prepare expense accounts.			3	8	6	7	3.71	89	60	193.	Compute costs and returns on the use of machinery and equipment.			3	3	5	1	3.33	40
183.	Read and understand trade magazines.			1	9	10	4	3.71	89	61	194.	Prepare delivery orders.	1	1	2	1	3	4	3.64	40
145.	Identify the legal responsibilities of a business serving the public.			5	3	11	5	3.67	88	62	161.	Use an adding machine.		1	3	3	2	3	3.25	39
171.	Handle adjustments, returns and special price allowances.			4	4	12	4	3.67	88	63	132.	Write clear and concise letters to customers.	1		2	5	1	3	3.45	38
176.	Make estimates of potential sales in your area.			1	9	11	3	3.67	88	64	152.	Discuss propagation, planting and transplanting of plants.	1		3	2	4	2	3.45	38

TABLE 4 --Continued

Comp. No.	Salesman Competencies Rated by Salesmen N=24	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Salesman Competencies Rated by Others N=12	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
159.	Determine cash discounts.		2	2	3	13	4	3.62	87	65	158.	Discuss crop harvesting practices.	1	1	3		4	3	3.45	38
132.	Write clear and concise letters to the customers.		1	2	7	10	4	3.58	86	66	165.	Compute interest costs.	1	1	1	4	3	2	3.36	37
134.	Read and interpret technical service manuals.	1		2	7	10	4	3.70	85	67	109.	Set up window and interior displays.			4	6		2	3.00	36
109.	Set up window and interior displays.			2	12	6	4	3.50	84	68	145.	Identify the legal responsibilities of a business serving the public.	1		3	3	4	1	3.27	36
+164.	Operate a cash register.		1	1	10	9	3	3.50	84	69	+154.	Discuss weed, pest and disease prevention, control and eradication.	1	1	2	3	3	2	3.27	36
182.	Complete weekly sales reports.			3	10	7	4	3.50	84	70	128.	Compute credit costs for the customer.	2		3	2	2	3	3.50	35
124.	Write and submit bids.			4	7	11	2	3.46	83	71	+173.	Make credit collections.	1	1	2	4	2	2	3.18	35
158.	Discuss crop harvesting practices.			2	11	9	2	3.46	83	72	+117.	Use a parts catalog and a parts price list.		2	4	2	2	2	2.83	34
+173.	Make credit collections.		1	2	9	9	3	3.46	83	73	146.	Operate large gas engine equipment.	1	1	5		3	2	3.00	33
+144.	Operate small gas engine equipment.			5	8	7	4	3.42	82	74	147.	Operate diesel engine equipment.	1	1	4	2	2	2	3.00	33
151.	Discuss soil tillage and land preparation practices.	1		1	10	10	2	3.57	82	75	176.	Make estimates of potential sales in your area.	1	1	4	2	2	2	3.00	33
192.	Prepare a washout sheet.	1			13	7	3	3.57	82	76	+153.	Discuss irrigation and drainage problems.	2	1	2	3	2	2	3.20	32
+117.	Use a parts catalog and a parts price list.	1	1	5	3	9	5	3.52	81	77	+156.	Discuss soil fertilization and plant nutrition.	1	1	3	4	2	1	2.91	32
+136.	Calculate equipment insurance costs.	1	1	3	9	6	4	3.39	78	78	171.	Handle adjustments, returns and special price allowances.	2	2	1	2	3	2	3.20	32
+175.	Prepare newspaper advertisements.		1	5	11	5	2	3.08	74	79	130.	Complete financial arrangements for customers who purchase machinery.	3		2	3	2	2	3.44	31
+150.	Maintain diesel engines.		2	7	7	5	3	3.00	72	80	+164.	Operate a cash register.	1	3	3	1	2	2	2.73	30

TABLE 4 --Continued

Comp. No.	Salesman Competencies Rated by Salesmen N=24	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Salesman Competencies Rated by Others N=12	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
+162.	Use a calculator.	1	1	5	9	7	1	3.09	71	81	+144.	Operate small gas engine equipment.	1	3	4	1	1	2	2.55	28
+149.	Maintain large gas engines.		2	7	9	3	3	2.92	70	82	+136.	Calculate equipment insurance costs.		5	1	4	2		2.25	27
+148.	Maintain small gas engines.		2	8	8	3	3	2.87	69	83	+175.	Prepare newspaper advertisements.	2	2	4	2		2	2.60	26
+156.	Discuss soil fertilization and plant nutrition.	1	3	3	11	6		2.87	66	84	+150.	Maintain diesel engines.	1	4	3	3		1	2.18	24
152.	Discuss propagation, planting and transplanting of plants.	1	3	7	7	5	1	2.74	63	85	+148.	Maintain small gas engines.	1	3	4	4			2.09	23
+153.	Discuss irrigation and drainage problems.	2	2	5	10	4	1	2.86	63	86	+149.	Maintain large gas engines.	2	2	4	3	1		2.30	23
+154.	Discuss weed, pest and diesease prevention, control and eradication.	1	1	8	10	4		2.74	63	87	+155.	Discuss pruning, thinning and training.	2	2	4	3	1		2.30	23
+157.	Discuss plant breeding, selection and reproduction.	2	4	7	8	3		2.45	54	88	+157.	Discuss plant breeding, selection and reproduction.	2	2	4	3	1		2.30	23
+155.	Discuss pruning, thinning and training.	3	4	7	7	3		2.43	51	89	+162.	Use a calculator.	2	3	3	3	1		2.20	22
+163.	Use a computer.	3	6	6	5	3	1	2.38	50	90	+163.	Use a computer.	2	6	2	2			1.60	16

* Competency appears on top 25 percent, both lists.
+ Competency appears on bottom 25 percent, both lists.

A Comparison of Parts Man Competencies

Twenty-six of the 37 who rated the competencies of a parts man were working as parts men. Only one mechanic rated the list of competencies while 5 managers, 4 supervisors and one salesman completed this section of the survey instrument.

There was close agreement on the lower 25 percent of the competencies with very limited agreement on the upper 25 percent. Of the 11 competencies ranked highest, only 5 appeared on both lists. The one notable difference among the ratings of the two groups related to the actual handling of money. The parts men gave these competencies a rather high rating while the others saw them as being much less important. Six of those competencies which the other respondents placed in the upper 25 percent but which were given a lesser rating by the parts men were directly related to maintaining a ready stock of parts. One could hypothesize that the parts men gave a higher ranking to those competencies which he performs most often in the conduct of his job.

A review of those competencies ranked in the lower 25 percent by all respondents tend to indicate that those competencies which require a working knowledge of the equipment sold in the dealership are of lesser concern to those employees who are classified as partsmen.

TABLE 5

COMPARATIVE RANKING OF PARTS MAN COMPETENCIES
GIVEN BY PARTS MEN AND OTHERS

Comp. No.	Parts Man Competencies Rated by Parts Men N=26	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
*224.	Make out sales receipts.			1			2 23	4.81	125	1
*201.	Dispense customer parts.		1				4 21	4.69	122	2
*219.	Unpack and check items received against a shipping invoice.			1	1		4 20	4.65	121	3
243.	Make proper change.				3		3 20	4.65	121	4
*210.	Use a parts price catalog.		1		3		1 21	4.58	119	5
229.	Maintain and use inventory control system in ordering parts and accessories.		2		1		3 20	4.50	117	6
215.	Receive and fill telephone orders for parts.		1		2		6 17	4.46	116	7
220.	Keep inventory control cards.		2		2		2 20	4.46	116	8
*223.	Read and follow parts bulletin.			1	3		5 17	4.46	116	9
242.	Operate a cash register.			1	5		1 19	4.46	116	10
227.	Keep department clean, orderly and attractive.			2	3		3 18	4.42	115	11
205.	Maintain parts identification.		1		3		6 16	4.38	114	12
202.	Conduct parts inventory.		1	1	3		4 17	4.35	113	13
203.	Maintain parts catalog.		1		3		7 15	4.35	113	14

Comp. No.	Parts Man Competencies Rated by Others N=11	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
214.	Mark and store parts in stock-room according to prearranged plan.					6	5	4.45	49
*224.	Make out sales receipts.				2	2	7	4.45	49
203.	Maintain parts catalog.			1	1	2	7	4.36	48
205.	Maintain parts identification.			1		4	6	4.36	48
*210.	Use a parts price catalog.			1		4	6	4.36	48
*219.	Unpack and check items received against a shipping invoice.			1		4	6	4.36	48
*201.	Dispense customer parts.			2		2	7	4.27	47
202.	Conduct parts inventory.			1	1	3	6	4.27	47
209.	Use the parts catalog to determine stock number and replacement part.			1		5	5	4.27	47
218.	Receive and acknowledge damage upon receipt from carrier.			1		5	5	4.27	47
*223.	Read and follow parts bulletin.			1		5	5	4.27	47
207.	Ascertain make, year and type of parts needed.	1		1		1	8	4.60	46
213.	Fill customer orders from stock.	1			1	2	7	4.60	46
215.	Receive and fill telephone orders for parts.				3	3	5	4.18	46

TABLE 5--Continued

Comp. No.	Parts Man Competencies Rated by Parts Men N=26	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
218.	Receive and acknowledge damage upon receipt from carrier.			2	4	4	16	4.31	112	15
209.	Use the parts catalog to determine stock number and replacement part.		1	1	5	2	17	4.27	111	16
213.	Fill customer orders from stock.		1		4	7	14	4.27	111	17
244.	Use adding machine.	1		1	4	4	16	4.40	110	18
214.	Mark and store parts in stockroom according to prearranged plan.		1	3	2	4	16	4.19	109	19
217.	Order parts from supply houses.		2	2	3	1	18	4.19	109	20
240.	Determine seasonal needs for parts.		2		4	5	15	4.19	109	21
207.	Ascertain make, year and type of parts needed.		1	2	3	7	13	4.12	107	22
228.	Identify and dispose of excess and obsolete stock.		2	2	2	7	13	4.04	105	23
206.	Conduct retail sales.	1	1	2	3	6	13	4.12	103	24
211.	Advise customer on substitution or modification of parts when replacement is not available.		1	2	4	9	10	3.96	103	25
238.	Explain parts warranty and guarantee provisions.		2	1	4	8	11	3.96	103	26
200.	Dispense shop parts.		1		3	8	14	4.31	102	27

Comp. No.	Parts Man Competencies Rated by Others N=11	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
227.	Keep department clean, orderly and attractive.				1	7	3	4.18	46
243.	Make proper change.				2	5	4	4.18	46
200.	Dispense shop parts.			1	2	3	5	4.09	45
206.	Conduct retail sales.			2	1	2	6	4.09	45
211.	Advise customer on substitution or modification of parts when replacement is not available.			2		4	5	4.09	45
217.	Order parts from supply houses.		1	1		3	6	4.09	45
220.	Keep inventory control cards.		1	1		3	6	4.09	45
240.	Determine seasonal needs for parts.		1		1	4	5	4.09	45
241.	Arrange parts room for efficient use.				3	4	4	4.09	45
229.	Maintain and use inventory control system in ordering parts and accessories.			1	3	2	5	4.00	44
242.	Operate a cash register.		1		1	5	4	4.00	44
244.	Use adding machine.			1	1	6	3	4.00	44
212.	Examine returned parts to determine if they are defective.			1	2	5	3	3.91	43

TABLE 5 --Continued

Comp. No.	Parts Man Competencies Rated by Parts Men N=26	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
241.	Arrange parts room for efficient use.		2	2	3	8	11	3.92	102	28
212.	Examine returned parts to determine if they are defective.		1	4	3	8	10	3.85	100	29
221.	Stock self-service shelves.		1	2	5	10	8	3.85	100	30
208.	Inspect damaged part to determine part required, or advise customer of part needed according to description of trouble.			4	3	13	6	3.81	99	31
226.	Keep sales records.		3		8	3	12	3.81	99	32
204.	Prepare and maintain displays.		1	2	10	4	9	3.69	96	33
232.	Demonstrate a working knowledge of agricultural machinery service department operating procedures.		1	2	6	12	5	3.69	96	34
+230.	Demonstrate a working knowledge of mechanical power transfer systems.		1	4	6	8	7	3.62	94	35
+231.	Demonstrate a working knowledge of hydraulic power transfer systems.		1	4	7	9	5	3.50	91	36
222.	Read and follow technical and service manuals.		3	2	8	7	6	3.42	89	37
+225.	Write descriptive letters.		2	1	12	7	4	3.38	88	38
+235.	Demonstrate a working knowledge of tractor tune-up and maintenance.		1	4	11	7	3	3.27	85	39

Comp. No.	Parts Man Competencies Rated by Others N=11	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
228.	Identify and dispose of excess and obsolete stock.		1	1	1	4	4	3.82	42
221.	Stock self-service shelves.		1	1	2	3	4	3.73	41
238.	Explain parts warranty and guarantee provisions.		1		3	4	3	3.73	41
204.	Prepare and maintain displays.			2	4	1	4	3.64	40
222.	Read and follow technical and service manuals.	1		2		4	4	4.00	40
239.	Prepare parts sales reports.				5	5	1	3.64	40
208.	Inspect damaged part to determine part required, or advise customer of part needed according to description of trouble.	1		1	3	3	3	3.80	38
226.	Keep sales records.	1		3	1	2	4	3.70	37
+230.	Demonstrate a working knowledge of mechanical power transfer systems.	1		1	4	2	3	3.70	37
+225.	Write descriptive letters.	1		1	3	5	1	3.60	36
+231.	Demonstrate a working knowledge of hydraulic power transfer systems.	1		3	2	2	3	3.50	35
232.	Demonstrate a working knowledge of agricultural machinery service department operating procedures.	1	1		4	3	2	3.50	35

TABLE 5 --Continued

Comp. No.	Parts Man Competencies Rated by Parts Men N=26	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Parts Man Competencies Rated by Others N=11	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
+237.	Demonstrate a working knowledge of diesel engine systems.		1	5	10	6	4	3.27	85	40	+216.	Maintain customer file.	1	1	2	2	3	2	3.30	33
+236.	Demonstrate a working knowledge of gasoline tractor engine systems.		1	5	11	6	3	3.19	83	41	+233.	Demonstrate a working knowledge of adjustment, maintenance and repair of tillage, planting, spraying and fertilizing machinery.	1	1	3	2	2	2	3.10	31
+216.	Maintain customer file.		2	5	10	5	4	3.15	82	42	+235.	Demonstrate a working knowledge of tractor tune-up and maintenance.	1	2	2	1	3	2	3.10	31
+234.	Demonstrate a working knowledge of adjustment, maintenance and repair of crop harvesting machinery.		2	6	9	5	4	3.12	81	43	+234.	Demonstrate a working knowledge of adjustment, maintenance and repair of crop harvesting machinery.	1	2	2	2	2	2	3.00	30
239.	Prepare parts sales reports.		4	1	12	6	3	3.12	81	44	+236.	Demonstrate a working knowledge of gasoline tractor engine systems.	1	2	2	2	2	2	3.00	30
+233.	Demonstrate a working knowledge of adjustment, maintenance and repair of tillage, planting, spraying and fertilizing machinery.	1	3	4	9	5	4	3.12	78	45	+237.	Demonstrate a working knowledge of diesel engine systems.	1	2	2	3	2	1	2.80	28

* Competency appears on top 25 percent, both lists.
\+ Competency appears on bottom 25 percent, both lists.

A Comparison of Office Worker Competencies

Twenty-six office workers ranked a total of 29 competencies related to their jobs. Only 4 others rated the competencies in this job title.

Both groups agreed on 5 of the 8 competencies ranked in the upper 25 percent. It is interesting to note that both groups give the highest ranking to those competencies relating directly to the maintenance of company books. From this, one could assume that office personnel in farm machinery dealerships have less occasion to contact, meet and work directly with the public served by the dealership.

There was agreement on 5 of the 8 competencies ranked in the lower 25 percent. These competencies, as those in the upper 25 percent, seem to indicate that any competency other than those which can be identified as a part of bookkeeping are considered to have less importance for office workers in farm machinery dealerships.

TABLE 6

COMPARATIVE RANKING OF OFFICE WORKER COMPETENCIES
GIVEN BY OFFICE WORKERS AND OTHERS

Comp. No.	Office Worker Competencies Rated by Office Workers N=26	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
279.	Use adding machine.				3	3	20	4.65	121	1
*254.	Balance books.				2	6	18	4.62	120	2
*255.	Summarize cash receipts and expenditures.			1	1	5	19	4.62	120	3
257.	Balance daily cash receipts.				3	4	19	4.62	120	4
268.	File correspondence and all business records and receipts.				2	6	18	4.62	120	5
*256.	Summarize accounts payable and receivable.			1	2	4	19	4.58	119	6
*258.	Balance accounts receivable.				3	5	18	4.58	119	7
*250.	Keep records of financial transactions of the business.		1	1	1	4	19	4.50	117	8
278.	Make accurate change.			1	2	6	17	4.50	117	9
261.	Prepare withholding, Social Security and other tax reports.	2			2	3	19	4.42	115	10
262.	Compute, type and mail monthly statements to customers.		1		3	6	16	4.38	114	11
251.	Enter details of transactions as they occur in chronological order in account and cash journals.		1	1	2	6	16	4.35	113	12
252.	Summarize details on separate ledgers.			2	4	5	15	4.27	111	13

Comp. No.	Office Worker Competencies Rated by Others N=4	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
253.	Transfer data to general ledger.			1		1	2	4.00	16
*254.	Balance books.			1		1	2	4.00	16
*258.	Balance accounts receivable.			1		1	2	4.00	16
262.	Compute, type and mail monthly statements to customers.			1		1	2	4.00	16
*250.	Keep records of financial transactions of the business.			1		2	1	3.75	15
252.	Summarize details on separate ledgers.			1		2	1	3.75	15
*255.	Summarize cash receipts and expenditures.			1		2	1	3.75	15
*256.	Summarize accounts payable and receivable.			1		2	1	3.75	15
257.	Balance daily cash receipts.			1		2	1	3.75	15
259.	Calculate employee wages from plant records or timecards and make up checks or withdraw cash from bank for payment of wages.			1		2	1	3.75	15
263.	Complete books to and through trial balance.			1		2	1	3.75	15
272.	Prepare month-end balance sheet.			1		2	1	3.75	15
279.	Use adding machine.				2	1	1	3.75	15

TABLE 6--Continued

Comp. No.	Office Worker Competencies Rated by Office Workers N=26	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
259.	Calculate employee wages from plant records or timecards and make up checks or withdraw cash from bank for payment of wages.		1	1	3	6	15	4.27	111	14
263.	Complete books to and through trial balance.		2		4	3	17	4.27	111	15
260.	Calculate and pay federal, state and local taxes.		2	1	3	3	17	4.23	110	16
253.	Transfer data to general ledger.	1	1	1	2	5	16	4.36	109	17
270.	Understand operation of the business.			1	7	9	9	4.00	104	18
272.	Prepare month-end balance sheet.		1	1	6	7	11	4.00	104	19
274.	Prepare clear, concise written reports.	1	1	1	3	8	12	4.16	104	20
266.	Answer phone.			2	7	7	10	3.96	103	21
271.	Understand the business organization.	1		1	6	9	9	4.04	101	22
265.	Type correspondence and reports.			3	9	3	11	3.85	100	23
*273.	Prepare profit and loss sheet.	1	1	2	5	7	10	3.92	98	24
264.	Operate calculating and bookkeeping machines.		1	3	8	4	10	3.73	97	25
+269.	Operate office machines.		1	3	8	5	9	3.69	96	26
276.	Prepare records of yearly sales.	1	1	3	8	4	9	3.68	92	27

Comp. No.	Office Worker Competencies Rated by Others N=4	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
251.	Enter details of transactions as they occur in chronological order in account and cash journals.			1	1	1	1	3.50	14
261.	Prepare withholding, Social Security and other tax reports.			1	1	1	1	3.50	14
268.	File correspondence and all business records and receipts.			1	1	1	1	3.50	14
260.	Calculate and pay federal, state and local taxes.			2		1	1	3.25	13
265.	Type correspondence and reports.			1	2		1	3.25	13
278.	Make accurate change.		1		1	1	1	3.25	13
264.	Operate calculating and bookkeeping machines.			1	3			2.75	11
276.	Prepare records of yearly sales.		1	1	1		1	2.75	11
266.	Answer phone.	1			2	1		3.33	10
+267.	Act as receptionist.			2	2			2.50	10
+269.	Operate office machines.			2	2			2.50	10
271.	Understand the business organization.		1	1	1	1		2.50	10
+273.	Prepare profit and loss sheet.			2	2			2.50	10
274.	Prepare clear, concise written reports.			2	2			2.50	10

TABLE 6--Continued

Comp. No.	Office Worker Competencies Rated by Office Workers N=26	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
+275.	Prepare sales reports.	1	1	4	10	3	7	3.44	86	28
+277.	Operate a cash register.	1	1	7	7	4	6	3.28	82	29
+267.	Act as receptionist.			2	9	8	1	6	3.00	78	30

Comp. No.	Office Worker Competencies Rated by Others N=4	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
270.	Understand operation of the business.		2		1	1		2.25	9
+275.	Prepare sales reports.		1	2	1			2.00	8
+277.	Operate a cash register.		2	1	1			1.75	7

* Competency appears on top 25 percent, both lists.
+ Competency appears on bottom 25 percent, both lists.

A Comparison of Technician Competencies

It can be noted in Table 7 that only 7 technicians rated the competencies they perform. Nine supervisors and 2 managers completed the ratings.

In contrast to the rating system used with the other competencies, a 0 ranking means that a competency was not performed in the s. op of those interviewed and does not necessarily indicate the competenc' is of No Importance to the successful operation of the dealership. The 0 rating previously meant No Response not No Importance. One would assume that the smaller businesses would have more limited facilities and expertise to perform many technical level skills.

Of the 25 percent or 8 competencies ranked highest by technicians and others, 6 appeared on both lists. It should be noted that the mean rating and the weighted score reflected by all respondents is quite high for the upper 25 percent of the competencies. The competencies "grind valve seats" and "hone cylinders" were given the highest ranking by both groups. This would seem to indicate the tasks are performed in all shops.

There was almost perfect agreement on the lower 25 percent of the competencies. Seven out of the 8 competencies appeared on both lists. The only difference within the two lists was with regard to two skills relating to the repair and servicing of diesel injector pumps.

During the process of developing the competencies an effort was made to identify all those tasks that would have to be performed in order to completely overhaul all equipment sold by the dealership. Thus, it was no surprise that a review of the lower 25 percent of the competencies revealed that a large number of the technicians do not perform these competencies as part of their job.

TABLE 7

COMPARATIVE RANKING OF MECHANICAL TECHNICIAN COMPETENCIES GIVEN BY MECHANICAL TECHNICIANS AND OTHERS

Comp. No.	Technician Competencies Rated by Technicians N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
*288.	Grind valves seats.					1	6	4.86	34	1
*293.	Hone cylinders.					1	6	4.86	34	2
*303.	Rebuild hydraulic pumps.					1	6	4.86	34	3
*300.	Rebuild hydraulic systems.				1		6	4.71	33	4
301.	Rebuild control valves.				1		6	4.71	33	5
*306.	Fit pistons.				1		6	4.71	33	6
*291.	Replace wet sleeves.				1	2	4	4.43	31	7
317.	Rebuild an engine and install spacers.	1					6	5.00	30	8
292.	Replace dry sleeves.		1			2	4	4.14	29	9
304.	Rebuild hydraulic motors.				3	1	3	4.00	28	10
307.	Size and align connecting rods.	1			2		4	4.33	26	11
309.	Rebuild rocker arms and shafts.	1			2		4	4.33	26	12
290.	Replace valve seats.	1			2	1	3	4.17	25	13
298.	Rebuild diesel fuel injectors.	1		1	1		4	4.17	25	14
316.	Estimate man-hours required to complete various jobs.			2	2		3	3.57	25	15
302.	Rebuild accumulators.	1		1	1	1	3	4.00	24	16
312.	Replace diodes in alternator.		1	1	2		3	3.43	24	17
305.	Rebuild flow dividers.				1	4	1	1	3.29	23	18

Comp. No.	Technician Competencies Rated by Others N=12	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
*288.	Grind valves seats.	1			1	2	8	4.64	51
*293.	Hone cylinders.	1			1	3	7	4.55	50
*291.	Replace wet sleeves.	1			2	3	6	4.36	48
292.	Replace dry sleeves.	1			2	3	6	4.36	48
*306.	Fit pistons.	1		1	1	2	7	4.36	48
*303.	Rebuild hydraulic pumps.	1			1	6	4	4.27	47
*300.	Rebuild hydraulic systems.	1			2	5	4	4.18	46
316.	Estimate man-hours required to complete various jobs.	1			4	2	5	4.09	45
304.	Rebuild hydraulic motors.	1			4	3	4	4.00	44
317.	Rebuild an engine and install spacers.	2			2	3	5	4.30	43
301.	Rebuild control valves.	2			3	4	3	4.00	40
305.	Rebuild flow dividers.	2		1	2	4	3	3.90	39
298.	Rebuild diesel fuel injectors.	3			2	3	4	4.22	38
312.	Replace diodes in alternator.	3			3	4	2	3.89	35
289.	Knurl valve guides.	4			3	2	3	4.00	32
311.	Rebuild a magneto.	4			3	2	3	4.00	32
314.	Repair supercharger, turbocharger and blower.	4			2	4	2	4.00	32
307.	Size and align connecting rods.	5			3	1	3	4.00	28

TABLE 7 --Continued

Comp. No.	Technician Competencies Rated by Technicians N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Technician Competencies Rated by Others N=12	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
314.	Repair supercharger, turbocharger and blower.	1	1		1	1	3	3.83	23	19	302.	Rebuild accumulators.	4		1	4	2	1	3.37	27
289.	Knurl valve guides.	2			1	1	3	4.40	22	20	290.	Replace valve seats.	5		1	2	2	2	3.71	26
311.	Rebuild a magneto.	1	1		2	2	1	3.33	20	21	313.	Rebuild and adjust voltage regulator.	4	2		4		2	3.00	24
315.	Repair and adjust hydraulic governor.		2	1	3		1	2.57	18	22	315.	Repair and adjust hydraulic governor.	5		2	2	3		3.14	22
313.	Rebuild and adjust voltage regulator.		1	2	4			2.43	17	23	309.	Rebuild rocker arms and shafts.	5	1	2	1	2	1	3.00	21
299.	Calibrate diesel injection pumps.	2	2		1		2	3.00	15	24	286.	Rebore an engine block.	6	1		3		2	3.33	20
286.	Rebore an engine block.	2	2	1		1	1	2.60	13	25	297.	Rebuild diesel fuel injection pump.	6		1	2	3		3.33	20
297.	Rebuild diesel fuel injection pump.	3	1	1			2	3.25	13	26	299.	Calibrate diesel injection pumps.	7	1	1	2	1		2.60	13
+294.	Knurl a piston.	2	2	2	1			1.80	9	27	+285.	Plane a cylinder head.	9	1		1	1		2.67	8
+295.	Balance a crankshaft.	3	2		2			2.00	8	28	+308.	Line bore an engine, camshaft and main bearings.	9	1		1	1		2.67	8
+285.	Plane a cylinder head.	4	2			1		2.00	6	29	+294.	Knurl a piston.	9	1		2			2.33	7
+310.	Wind a generator and starter armature.	3	2	2				1.50	6	30	+295.	Balance a crankshaft.	10			1	1		3.50	7
+287.	Turn a crankshaft.	4	3					1.00	3	31	+310.	Wind a generator and starter armature.	9	2		1			1.67	5
+296.	Rebuild a crankshaft.	4	3					1.00	3	32	+287.	Turn a crankshaft.	10	1		1			2.00	4
+308.	Line bore an engine, camshaft and main bearings.	4	3					1.00	3	33	+296.	Retuild a crankshaft.	10	1		1			2.00	4

* Competency appears on top 25 percent, both lists.
+ Competency appears on bottom 25 percent, both lists.

A Comparison of Mechanic Competencies

There was a total of 210 competencies identified for the mechanic job title. Because of the great number of competencies, they were grouped according to the systems. In this report, a system relates to the particular part(s) of the engine or piece of equipment that performes a specific function. The competencies were grouped under welding and one or more of the following systems:

a. General Skills
b. Storage battery
c. Ignition circuit
d. Cooling system
e. Charging circuit
f. Starting circuit
g. Intake and exhaust system
h. Gasoline fuel system
i. Diesel fuel system
j. Basic engine
k. Lubrication system
l. Clutches
m. Governing system
n. Hydraulics
o. Power train
p. Hydrostatic drive
q. Torque Converter
r. Differentials
s. Final drive
t. Power take-off
u. Special drives
v. Welding

It should be noted from Table 8 that some competencies appear to be duplicated. This is not the case. In a number of cases, the same competency is performed but within an entirely different system.

A total of 44 persons rated the mechanic competencies 30 of whom were mechanics. "Read and follow technical service manuals," was the single competency rated highest by all respondents. Likewise, "Knurl a piston," was the single competency receiving the lowest rating. Of the

53 competencies in the upper 25 percent, 25 appeared on both lists.

An examination of 53 competencies in the upper 25 percent, as rated by mechanics, indicates there is only a 15 point difference in weighted scores from the first to last competency within the upper group. Only a 9 point spread appeared in the upper 25 percent of the competencies ranked by others. It seems significant to note that a large number of competencies within both lists received the same weighted score and the same mean rating.

Thirty-eight of the 53 competencies in the lower 25 percent appeared on both lists. One can hypothesize from a perusal of the competencies that many require a high level of technical skill and a large amount of expensive equipment to perform them and this skill and equipment are not accessible to many of the shops.

TABLE 6

COMPARATIVE RANKING OF MECHANIC COMPETENCIES
GIVEN BY MECHANICS AND OTHERS

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
*329.	Read technical service manuals.				1	7	22	4.70	141	1	*329.	Read technical service manuals.				1	2	11	4.71	66
*444.	Adjust valve clearance.				1	8	21	4.67	140	2	*335.	Lubricate machinery and equipment.				1	4	9	4.57	64
*449.	Torque main bearings.				1	9	20	4.63	139	3	*337.	Communicate effectively to customers or foreman.				2	2	10	4.57	64
435.	Remove carbon from ring grooves.				1	12	17	4.53	136	4	*328.	Maintain shop equipment.				1	6	7	4.43	62
451.	Install connecting rod caps.				2	10	18	4.53	136	5	*334.	Maintain cleanliness in the work area.				1	6	7	4.43	62
462.	Adjust clutch free play.				2	10	18	4.53	136	6	*332.	Clean disassembled components for inspection.		1			6	7	4.36	61
*423.	Grind valves.				1	14	15	4.47	134	7	336.	Demonstrate a basic understanding of parts.				2	6	6	4.29	60
447.	Install main bearings and caps.				2	12	16	4.47	134	8	*346.	Identify component problems after disassembly.		1			7	6	4.29	60
450.	Install rod bearings.				2	12	16	4.47	134	9	*363.	Set ignition timing using a timing light.	1			1	4	8	4.29	60
452.	Check bearing clearance during installation.				1	14	15	4.47	134	10	496.	Repair or rebuild sliding gear transmissions.			1	1	5	7	4.29	60
*332.	Clean disassembled components for inspection.				3	11	16	4.43	133	11	330.	Operate machinery.				3	5	6	4.21	59
*345.	Trouble shoot and identify operational problems.				4	9	17	4.43	133	12	*331.	Clean machinery prior to disassembly or clean component parts.			1	1	6	6	4.21	59
*363.	Set ignition timing using a timing light.		1		3	7	19	4.43	133	13	344.	Inspect damage part to determine part required, or advise customer of part needed according to the description of trouble.			1		8	5	4.21	59
436.	Measure piston ring land clearance.				1	15	14	4.43	133	14	*345.	Trouble shoot and identify operational problems.			1	1	6	6	4.21	59

TABLE 8 --Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
437.	Check piston ring end gap.				2	13	15	4.43	133	15
*439.	Replace piston rings.				3	11	16	4.43	133	16
*440.	Check and measure crankshaft main and rod journals.				3	11	16	4.43	133	17
425.	Reface valve seats.				1	16	13	4.40	132	18
*331.	Clean machinery prior to disassembly or clean component parts.				3	13	14	4.37	131	19
*334.	Maintain cleanliness in the work area.				3	13	14	4.37	131	20
*346.	Identify component problems after disassembly.	1			2	10	17	4.52	131	21
433.	De-glaze cylinder.			1	2	12	15	4.37	131	22
446.	Install a crankshaft.				3	13	14	4.37	131	23
448.	Install rear-main oil seals.				3	13	14	4.37	131	24
456.	Install timing chain or gears.				3	13	14	4.37	131	25
*325.	Repair equipment under field conditions.			1	2	13	14	4.33	130	26
432.	Remove piston assembly.				4	12	14	4.33	130	27
453.	Install piston assembly.				4	12	14	4.33	130	28
463.	Service and adjust a dry clutch.				2	16	12	4.33	130	29
516.	Preload bearings.				3	14	13	4.33	130	30
*328.	Maintain shop equipment.				3	15	12	4.30	129	31
*335.	Lubricate machinery and equipment.				4	13	13	4.30	129	32

Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
*418.	Bleed a diesel fuel system.			1	1	6	6	4.21	59
*494.	Preload bearing in gear train.			1	1	6	6	4.21	59
495.	Service and adjust sliding gear transmissions.			2		5	7	4.21	59
513.	Repair differentials.			1	2	4	7	4.21	59
514.	Correct adjustment of ring gear and pinion.			2		5	7	4.21	59
*520.	Preload and install bearings in final drive.			2		5	7	4.21	59
522.	Adjust end play in final drive.			1	2	4	7	4.21	59
*325.	Repair equipment under field conditions.			1	2	5	6	4.14	58
343.	Repair brake assemblies.		1		1	6	6	4.14	58
347.	Install wheel bearings.		1		1	6	6	4.14	58
*360.	Replace distributor points and condenser.		1		2	4	7	4.14	58
*398.	Service a dry element air cleaner.		1		2	4	7	4.14	58
403.	Adjust engine idle.		1		1	6	6	4.14	58
404.	Clean carburetor.		1	1		5	7	4.14	58
412.	Replace diesel fuel filters.			1	2	5	6	4.14	58
*415.	Install the diesel injection pump.			2		6	6	4.14	58
*426.	Install cylinder heads.			1	2	5	6	4.14	58
479.	Analyze malfunctions of hydraulic valves.			2	1	4	7	4.14	58

TABLE 8 --Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
*415.	Install the diesel injection pump.			1	3	12	14	4.30	129	33
431.	Remove cylinder ridge.				3	15	12	4.30	129	34
434.	Measure cylinder taper.			1	4	10	15	4.30	129	35
430.	Replace rear engine oil seal.				5	12	13	4.27	128	36
454.	Measure camshaft for wear.				4	14	12	4.27	128	37
*520.	Preload and install bearings in final drive.				4	14	12	4.27	128	38
*360.	Replace distributor points and condenser.		1		3	13	13	4.23	127	39
*398.	Service a dry element air cleaner.			1	4	12	13	4.23	127	40
411.	Time fuel injector to the engine.	1		2	2	8	17	4.38	127	41
*418.	Bleed a diesel fuel system.			2	3	11	14	4.23	127	42
420.	Determine valve stem guide clearance.				4	15	11	4.23	127	43
*426.	Install cylinder heads.				5	13	12	4.23	127	44
427.	Check cylinder head for block warpage.		1		2	15	12	4.23	127	45
*428.	Remove, inspect and replace intake manifold.				5	13	12	4.23	127	46
458.	Check and adjust engine oil pressure.				5	13	12	4.23	127	47
*460.	Change oil filters.				6	11	13	4.23	127	48

Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
492.	Determine backlash and clearance in gear train.			2		6	6	4.14	58
512.	Analyze the failure of gear or bearing.			2	1	4	7	4.14	58
517.	Service and adjust final drives.			2		6	6	4.14	58
519.	Repair final drives.			1	2	5	6	4.14	58
524.	Repair and adjust power take-off drive.			1	2	5	6	4.14	58
326.	Recondition trade-ins.			1	2	6	5	4.07	57
348.	Test engine compression.		1		2	5	6	4.07	57
354.	Trouble shoot and identify ignition problems.		1		2	5	6	4.07	57
367.	Remove, adjust and/or replace fan belt.			1	2	6	5	4.07	57
368.	Identify faulty fanbelts.			1	2	6	5	4.07	57
397.	Clean and replace oil in oilbath air cleaners.			1	3	4	6	4.07	57
400.	Replace fuel pump.		1	1		6	6	4.07	57
402.	Adjust carburetor idle air/fuel mixture.		1	1		6	6	4.07	57
*423.	Grind valves.		1	1	2	2	8	4.07	57
*428.	Remove, inspect and replace intake manifold.		1		2	5	6	4.07	57
*439.	Replace piston rings.		1		3	3	7	4.07	57

TABLE 8--Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
470.	Service and adjust an engine governor.			1	3	14	12	4.23	127	49	*440.	Check and measure crankshaft main and rod journals.		1	1	2	2	8	4.07	57
*494.	Preload bearing in gear train.				7	9	14	4.23	127	50	442.	Replace wet sleeves.			2	1	5	6	4.07	57
*337.	Communicate effectively to customers or foreman.		1		2	16	11	4.20	126	51	*444.	Adjust valve clearance.			2	2	3	7	4.07	57
429.	Replace oil pan gasket assembly.		1		4	12	13	4.20	126	52	*449.	Torque main bearings.		1		3	3	7	4.07	57
438.	Clean oil passages.				5	14	11	4.20	126	53	*460.	Change oil filters.			2	2	3	7	4.07	57
476.	Analyze malfunctions of hydraulic pumps.			1	4	13	12	4.20	126	54	461.	Drain and refill engine oil.			2	2	3	7	4.07	57
487.	Analyze a hydraulic system.			1	3	15	11	4.20	126	55	497.	Repair or rebuild constant mesh transmissions.			2	1	5	6	4.07	57
491.	Change hydraulic filters.			2	4	10	14	4.20	126	56	498.	Repair and rebuild power shift transmissions.		1	1	1	4	7	4.07	57
492.	Determine backlash and clearance in gear train.				7	10	13	4.20	126	57	501.	Service and adjust a hydrostatic drive.			1	2	6	5	4.07	57
514.	Correct adjustment of ring gear and pinion.	1			3	13	13	4.34	126	58	503.	Trouble shoot a hydrostatic drive.				4	5	5	4.07	57
517.	Service and adjust final drives.				5	14	11	4.20	126	59	521.	Trouble shoot final drives.			2	1	5	6	4.07	57
344.	Inspect damaged part to determine part required, or advise customer of part needed according to description of trouble.	1			4	12	13	4.31	125	60	327.	Make preliminary equipment checks to determine need for repair.			1	3	5	5	4.00	56
389.	Trouble shoot starter problems.				6	13	11	4.17	125	61	333.	Clean and inspect new parts for shipping damage in preparation for installation.	1		1		6	6	4.31	56
416.	Remove, clean and replace injector nozzle.			2	4	11	13	4.17	125	62	350.	Use a hydrometer to determine the specific gravity of a battery.		1		2	6	5	4.00	56

TABLE 8 --Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
461.	Drain and refill engine oil.			1	6	10	13	4.17	125	63
464.	Service and adjust a wet clutch.		1		3	15	11	4.17	125	64
522.	Adjust end play in final drive.				5	15	10	4.17	125	65
524.	Repair and adjust power take-off drive.				6	13	11	4.17	125	66
336.	Demonstrate a basic understanding of parts.			1	5	13	11	4.13	124	67
354.	Trouble shoot and identify ignition problems.				5	16	9	4.13	124	68
421.	Replace valve guides.				5	16	9	4.13	124	69
493.	Determine endplay movement in gear shaft.				7	12	11	4.13	124	70
327.	Make preliminary equipment checks to determine need for repair.				7	13	10	4.10	123	71
397.	Clean and replace oil in oilbath air cleaners.			1	7	10	12	4.10	123	72
422.	Test valve springs.				9	9	12	4.10	123	73
442.	Replace wet sleeves.			2	4	13	11	4.10	123	74
443.	Replace dry sleeves.			1	6	12	11	4.10	123	75
469.	Trouble shoot clutches.				6	15	9	4.10	123	76
477.	Service and repair hydraulic pumps.			1	4	16	9	4.10	123	77
519.	Repair final drives.				7	13	10	4.10	123	78

Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
353.	Charge or recharge a wet cell battery.			1	2	7	4	4.00	56
361.	Set breaker point dwell using a dwell meter.		2		1	4	7	4.00	56
364.	Replace primary and secondary ignition cables.		1		2	6	5	4.00	56
369.	Replace radiator hose.			1	3	5	5	4.00	56
370.	Test cooling system for leaks.			1	3	5	5	4.00	56
371.	Replace engine thermostat.			1	3	5	5	4.00	56
376.	Test, replace and adjust the generator or alternator regulator.		1	1	1	5	6	4.00	56
389.	Trouble shoot starter problems.		1		2	6	5	4.00	56
435.	Remove carbon from ring grooves.		1	1	2	3	7	4.00	56
446.	Install a crankshaft.		1	1	2	3	7	4.00	56
447.	Install main bearings and caps.		1	1	2	3	7	4.00	56
448.	Install rear-main oil seals.		1	1	2	3	7	4.00	56
452.	Check bearing clearance during installation.		1		3	4	6	4.00	56
453.	Install piston assembly.		1	1	2	3	7	4.00	56
462.	Adjust clutch free play.		1	1	2	3	7	4.00	56
463.	Service and adjust a dry clutch.		1	1	2	3	7	4.00	56

TABLE 8 --Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
527.	Trouble shoot power take-off drive.				8	11	11	4.10	123	79
333.	Clean and inspect new parts for shipping damage in preparation for installation.	1		1	5	10	13	4.21	122	80
343.	Repair brake assemblies.			3	2	15	10	4.07	122	81
405.	Install carburetor kit.		1		6	12	11	4.07	122	82
406.	Adjust carburetor float.		1		6	12	11	4.07	122	83
412.	Replace diesel fuel filters.		1	2	5	8	14	4.07	122	84
455.	Replace camshaft bearings.		1		6	12	11	4.07	122	85
471.	Repair an engine governor.			2	5	12	11	4.07	122	86
475.	Service and repair internal hydraulic pumps.				7	14	9	4.07	122	87
478.	Service and repair hydraulic valves.			1	4	17	8	4.07	122	88
512.	Analyze the failure of gear or bearing.	1			4	15	10	4.21	122	89
382.	Check armature and fields.		1	2	5	9	13	4.03	121	90
399.	Replace fuel filters.				8	13	9	4.03	121	91
474.	Service external hydraulic pumps.				7	15	8	4.03	121	92
496.	Repair or rebuild sliding gear transmissions.				9	11	10	4.03	121	93
513.	Repair differentials.	1			5	14	10	4.17	121	94
515.	Trouble shoot differentials.			1	6	14	9	4.03	121	95

Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
469.	Trouble shoot clutches.			2	1	6	5	4.00	56
474.	Service external hydraulic pumps.			1	3	5	5	4.00	56
475.	Service and repair internal hydraulic pumps.			1	3	5	5	4.00	56
476.	Analyze malfunctions of hydraulic pumps.			2	1	6	5	4.00	56
487.	Analyze a hydraulic system.			2	1	6	5	4.00	56
491.	Change hydraulic filters.			1	4	3	6	4.00	56
493.	Determine endplay movement in gear shaft.			2	1	6	5	4.00	56
499.	Service and adjust hydraulic pump.			1	3	5	5	4.00	56
500.	Service and adjust hydraulic motor.			1	3	5	5	4.00	56
525.	Service and repair U-joints.			1	3	5	5	4.00	56
527.	Trouble shoot power take-off drive.			1	2	7	4	4.00	56
356.	Regap and test sparkplugs.		1		2	7	4	3.93	55
372.	Replace water pump.			2	2	5	5	3.93	55
390.	Replace starter brushes.		1		2	7	4	3.93	55
394.	Check solenoid.		1	1	1	6	5	3.93	55
399.	Replace fuel filters.		1	1	2	4	6	3.93	55
405.	Install carburetor kit.		2		1	5	6	3.93	55

TABLE 8 --Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
353.	Charge or recharge a wet cell battery.			2	8	8	12	4.00	120	96
367.	Remove, adjust and/or replace fanbelts.		1		8	10	11	4.00	120	97
368.	Identify faulty fanbelts.		1	1	7	9	12	4.00	120	98
404.	Clean carburetor.		1		6	14	9	4.00	120	99
417.	Analyze the operation of the diesel injector nozzle.			2	6	12	10	4.00	120	100
473.	Identify governor malfunctions.			2	5	14	9	4.00	120	101
495.	Service and adjust sliding gear transmissions.				10	10	10	4.00	120	102
497.	Repair or rebuild constant mesh transmissions.				11	8	11	4.00	120	103
526.	Service and repair drive shafts.		1	2	4	12	11	4.00	120	104
348.	Test engine compression.		1	2	7	7	13	3.97	119	105
369.	Replace radiator hose.		1		8	11	10	3.97	119	106
377.	Trouble shoot and identify problems in a charging circuit.	1	1		5	12	11	4.10	119	107
379.	Replace generator brushes.			2	8	9	11	3.97	119	108
403.	Adjust engine idle.				8	15	7	3.97	119	109
409.	Analyze a diesel fuel injector.			2	6	13	9	3.97	119	110
424.	Replace rocker arms.			2	6	13	9	3.97	119	111

Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
411.	Time fuel injector to engine.			3		6	5	3.93	55
416.	Remove, clean and replace injector nozzle.		1	2		5	6	3.93	55
417.	Analyze the operation of the diesel injector nozzle.		1	2		5	6	3.93	55
422.	Test valve springs.		1	2	1	3	7	3.93	55
430.	Replace rear engine oil seal.		1	1	2	4	6	3.93	55
431.	Remove cylinder ridge.		1	2	1	3	7	3.93	55
432.	Remove piston assembly.		1	2	1	3	7	3.93	55
433.	De-glaze cylinder.		1	2	1	3	7	3.93	55
434.	Measure cylinder taper.		1	1	2	4	6	3.93	55
450.	Install rod bearings.		1	1	2	4	6	3.93	55
451.	Install connecting rod caps.		1	1	2	4	6	3.93	55
473.	Identify governor malfunctions.			2	2	5	5	3.93	55
485.	Clean and flush the hydraulic motor system.			1	4	4	5	3.93	55
486.	Operate and analyze an hydraulic tester.			2	1	7	4	3.93	55
502.	Repair an hydrostatic drive.			2	2	5	5	3.93	55
511.	Adjust and service differential locks (mechanical hydraulic).			3		6	5	3.93	55

TABLE 8 --Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
511.	Adjust and service differential locks (mechanical, hydraulic).	1			6	14	9	4.10	119	112	515.	Trouble shoot differentials.			2	2	5	5	3.93	55
525.	Service and repair U-joints.		1	1	6	12	10	3.97	119	113	516.	Preload bearings.			2	2	5	5	3.93	55
532.	Service and repair variable speed belt drives.			1	7	14	8	3.97	119	114	358.	Test an ignition distributor.		2		2	4	6	3.86	54
326.	Recondition trade-ins.			1	9	11	9	3.93	118	115	373.	Test thermostat.			1	4	5	4	3.86	54
349.	Determine the correct electrolyte level of a battery.			2	8	10	10	3.93	118	116	377.	Trouble shoot and identify problems in a charging circuit.		2		1	6	5	3.86	54
376.	Test, replace and adjust the generator or alternator regulator.	1	1	1	6	8	13	4.07	118	117	381.	Replace bearings.		1	1	2	5	5	3.86	54
392.	Replace bearings and bushings.		1	1	7	11	10	3.93	118	118	396.	Replace starter drive.		1	1	2	5	5	3.86	54
394.	Check solenoid.		1	2	5	12	10	3.93	118	119	406.	Adjust carburetor float.		2	1		5	6	3.86	54
402.	Adjust carburetor idle air/fuel mixture.		1	1	6	13	9	3.93	118	120	409.	Analyze a diesel fuel injector.		1	2		6	5	3.86	54
480.	Repair hydraulic cylinders.			1	9	11	9	3.93	118	121	424.	Replace rocker arms.		1		4	4	5	3.86	54
518.	Service and repair inboard and outboard mounted planetary drives.	1		1	6	12	10	4.07	118	122	436.	Measure piston ring land clearance.		1	2	2	2	7	3.86	54
521.	Trouble shoot final drives.			2	7	12	9	3.93	118	123	437.	Check piston ring end gap.		1	2	2	2	7	3.86	54
356.	Regap and test sparkplugs.		1		11	7	11	3.90	117	124	438.	Clean oil passages.		1	1	2	5	5	3.86	54
393.	Check armature and fields.	1	1	2	6	6	14	4.03	117	125	454.	Measure camshaft for wear.		1	1	3	3	6	3.86	54
457.	Service and repair oil pumps.	2			5	13	10	4.18	117	126	458.	Check and adjust engine oil pressure.		1	2	2	2	7	3.86	54
479.	Analyze malfunctions of hydraulic valves.	1		2	5	12	10	4.03	117	127	470.	Service and adjust an engine governor.			2	3	4	5	3.86	54
486.	Operate and analyze a hydraulic tester.	1	1	1	4	13	10	4.03	117	128	484.	Replace hydraulic fittings.			1	5	3	5	3.86	54

TABLE 8 --Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
523.	Adjust chain drive in final drive.			2	7	13	8	3.90	117	129
534.	Service and repair gear drives.			2	7	13	8	3.90	117	130
401.	Test a fuel pump.		1		8	14	7	3.87	116	131
484.	Replace hydraulic fittings.	1		1	8	10	10	4.00	116	132
395.	Remove, clean and evaluate sparkplugs.		1	3	6	10	10	3.83	115	133
381.	Replace bearing.		2	1	7	10	10	3.83	115	134
396.	Replace starter drive.		1	1	8	12	8	3.83	115	135
400.	Replace fuel pump.			1	10	12	7	3.83	115	136
488.	Service and adjust hydraulic assist transmissions.	1		2	6	12	9	3.97	115	137
498.	Repair and rebuild power shift transmissions.	1			9	12	8	3.97	115	138
531.	Service and repair belt drives.			1	9	14	6	3.83	115	139
533.	Service and repair chain drives.		1	1	7	14	7	3.83	115	140
372.	Replace water pump.			3	8	11	8	3.80	114	141
468.	Repair a wet clutch.		1		8	16	5	3.80	114	142
350.	Use a hydrometer to determine the specific gravity of a battery.		1	3	6	12	8	3.77	113	143
390.	Replace starter brushes.			1	12	10	7	3.77	113	144

Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
526.	Service and repair drive shafts.			1	4	5	4	3.86	54
352.	Run a load test on a battery to determine serviceability.		2		2	5	5	3.79	53
375.	Test charging circuit using a voltmeter, ammeter and/or carbonpile.		1	1	3	4	5	3.79	53
392.	Replace bearings and bushings.		1	1	2	6	4	3.79	53
455.	Replace camshaft bearings.		1	1	3	4	5	3.79	53
457.	Service and repair oil pumps.		1	2	2	3	6	3.79	53
464.	Service and adjust a wet clutch.		2	1	2	2	7	3.79	53
467.	Repair an overrunning clutch.		1	1	3	4	5	3.79	53
468.	Repair a wet clutch.		2	1	1	4	6	3.79	53
523.	Adjust chain drive in final drive.		1	1	3	4	5	3.79	53
342.	Use the dynamometer.		2		3	4	5	3.71	52
357.	Test and/or replace ignition coil.		2		3	4	5	3.71	52
374.	Flush and clean radiator.	1		1	2	6	4	4.00	52
393.	Check armature and fields.		1	2	1	6	4	3.71	52
401.	Test a fuel pump.		2	1	1	5	5	3.71	52
408.	Replace carburetor jets.		2	1	1	5	5	3.71	52

TABLE 8--Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
485.	Clean and flush the hydraulic motor system.	1		1	8	13	7	3.90	113	145	410.	Repair a diesel transfer pump.		1	2	1	6	4	3.71	52
330.	Operate machinery.	1		2	8	11	8	3.86	112	146	429.	Replace oil pan gasket assembly.	1	1	1	1	4	6	4.00	52
358.	Test an ignition distributor.		3		7	12	8	3.73	112	147	471.	Repair an engine governor.			3	3	3	5	3.71	52
362.	Test distributor advance mechanism.		2	1	5	17	5	3.73	112	148	477.	Service and repair hydraulic pumps.	1		2	1	5	5	4.00	52
370.	Test cooling system for leaks.		1	1	8	15	5	3.73	112	149	478.	Service and repair hydraulic valves.	1		2	1	5	5	4.00	52
378.	Polarize a tractor generator and test on bench.	1	1	2	6	11	9	3.86	112	150	518.	Service and repair inboard and outboard mounted planetary drives.		1	2	1	6	4	3.71	52
388.	Remove and replace starter motors.		2	1	9	9	9	3.73	112	151	355.	Remove, clean and evaluate sparkplugs.	1	1		2	6	4	3.92	51
481.	Maintain hydraulic cylinders.			2	11	10	7	3.73	112	152	359.	Remove and replace ignition distributor.		2		3	5	4	3.64	51
361.	Set breaker point dwell using a dwell meter.	1	3		6	10	10	3.83	111	153	362.	Test distributor advance mechanism.	1	2		1	4	6	3.92	51
371.	Replace engine thermostat.	1		2	10	8	9	3.83	111	154	382.	Check armature and fields.		1	2	2	5	4	3.64	51
408.	Replace carburetor jets.		1	2	9	11	7	3.70	111	155	421.	Replace valve guides.		1	3	2	2	6	3.64	51
347.	Install wheel bearings.	1		5	6	8	10	3.79	110	156	456.	Install timing chain or gears.		1	1	4	4	4	3.64	51
364.	Replace primary and secondary ignition cables.		1	3	8	11	7	3.67	110	157	339.	Check air pressure in tires.	1	2		2	3	6	3.85	50
+383.	Test alternator diodes and replace heat sink.		2	2	8	10	8	3.67	110	158	349.	Determine the correct electrolyte level of a battery.	1	1		2	7	3	3.85	50
+483.	Repair hydraulic motors.	2	1		7	13	7	3.89	109	159	379.	Replace generator brushes.		2		3	6	3	3.57	50
+490.	Trouble shoot a hydraulic assist transmission.	1	1	4	2	16	6	3.76	109	160	388.	Remove and replace starter motors.	1	1		4	3	5	3.85	50

TABLE 8 -- Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
359.	Remove and replace ignition distributor.		4	2	5	10	9	3.60	108	161
+395.	Replace starter motor solenoid.		2	2	9	10	7	3.60	108	162
+482.	Service hydraulic motors.	1	1		11	11	6	3.72	108	163
+489.	Repair hydraulic assist transmissions.	1	1	3	7	10	8	3.72	108	164
339.	Check air pressure in tires.			2	12	13	3	3.57	107	165
342.	Use a dynamometer.		2	3	8	10	7	3.57	107	166
357.	Test and/or replace ignition coil.		3	2	7	11	7	3.57	107	167
375.	Test charging circuit using a voltmeter, ammeter, and/or carbonpile.		3		11	10	6	3.53	106	168
+385.	Replace bearing brushes and turn slip rings.		3	2	8	10	7	3.53	106	169
499.	Service and adjust hydraulic pump.	2	1	2	6	13	6	3.75	105	170
503.	Trouble shoot a hydrostatic drive.	3		3	4	13	7	3.89	105	171
+528.	Demonstrate a basic proficiency in acetylene welding.	2	1	1	8	12	6	3.75	105	172
+386.	Test stator windings in alternator.		3	2	9	10	6	3.47	104	173
+459.	Service and repair oil coolers.	2	1	1	9	11	6	3.71	104	174
467.	Repair an overrunning clutch.	2	2	2	6	10	8	3.71	104	175
+529.	Demonstrate a basic proficiency in arc welding.	2	1	1	8	14	4	3.68	103	176

Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
+395.	Replace starter motor solenoid.	1	1	1	2	4	5	3.85	50
+419.	Service and maintain turbochargers.		1	2	3	4	4	3.57	50
425.	Reface valve seats.	1	1	1	2	4	5	3.85	50
427.	Check cylinder head for block warpage.	1	1	1	2	4	5	3.85	50
443.	Replace dry sleeves.		2	2	1	4	5	3.57	50
480.	Repair hydraulic cylinders.	1		2	3	4	4	3.77	49
534.	Service and repair gear drives.	1		2	4	2	5	3.77	49
+351.	Determine the voltage of a battery using a voltmeter.		3		3	4	4	3.43	48
+366.	Repair and trouble shoot magneto.		2		5	4	3	3.43	48
420.	Determine valve stem guide clearance.	1	2	2	1	1	7	3.69	48
+482.	Service hydraulic motors.	1	1	2	2	3	5	3.69	48
488.	Service and adjust hydraulic assist transmissions.		2	2	2	4	4	3.43	48
+489.	Repair hydraulic assist transmissions.		2	3	1	3	5	3.43	48
+490.	Trouble shoot a hydraulic assist transmission.		2	3	1	3	5	3.43	48
531.	Service and repair belt drives.	1	1	1	4	2	5	3.69	48
+483.	Repair hydraulic motors.	1	1	3	1	3	5	3.62	47

TABLE 8 --Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
352.	Run a load test on a battery to determine serviceability.		5	1	9	7	8	3.40	102	177
374.	Flush and clean radiator.		2	2	11	12	3	3.40	102	178
502.	Repair a hydrostatic drive.	3	1	2	6	11	7	3.78	102	179
+504.	Check for overheating, noise level and leaks on a torque converter.	3	1	1	7	12	6	3.78	102	180
500.	Service and adjust hydraulic motor.	3	1	2	6	12	6	3.74	101	181
501.	Service and adjust a hydrostatic drive.	3	1	2	6	12	6	3.74	101	182
373.	Test thermostat.	1	2	2	10	11	4	3.45	100	183
+384.	Replace diodes.	1	3	2	8	11	5	3.45	100	184
+338.	Check tires for defects.			7	10	10	3	3.30	99	185
+351.	Determine the voltage of a battery using the voltmeter.		4	4	7	9	6	3.30	99	186
+472.	Repair and adjust hydraulic governor.	2	2	3	8	8	7	3.54	99	187
+366.	Repair and trouble shoot magneto.	1	3	3	7	12	4	3.38	98	188
+509.	Inspect a torque converter and seals for internal damage.	4	1	1	7	13	4	3.69	96	189
+387.	Adjust voltage regulator.		4	4	9	9	4	3.17	95	190
+505.	Service a torque converter.	4	1	1	7	14	3	3.65	95	191

Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
+338.	Check tires for defects.	1	2		4	3	4	3.5-	46
+365.	Determine resistance using ohmmeter.	1	2		3	5	3	3.54	46
378.	Polarize a tractor generator and test on bench.	1	2		3	5	3	3.54	46
+385.	Replace bearing brushes and turn slip rings.	1	1	2	2	5	3	3.54	46
+386.	Test stator windings in alternator.	1	1	2	2	5	3	3.54	46
+505.	Service a torque converter.		2	4		4	4	3.29	46
+508.	Remove a torque converter.		2	2	3	4	3	3.29	46
481.	Maintain hydraulic cylinders.	2		2	3	3	4	3.75	45
+504.	Check for overheating, noise level and leaks on a torque converter.		2	3	2	4	3	3.21	45
532.	Service and repair variable speed belt drives.	1	1	1	5	3	3	3.46	45
+509.	Inspect a torque converter and seals for internal damage.		3	3		5	3	3.14	44
+510.	Do a stall test on a torque converter.		3	2	1	6	2	3.14	44
+465.	Repair a magnetic clutch.	1	2	1	4	3	3	3.31	43
+384.	Replace diodes.	1	2	2	3	3	3	3.23	42
+387.	Adjust voltage regulator.	1	2	2	3	3	3	3.23	42

TABLE 8 --Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
+508.	Remove a torque converter.	4	1	1	10	8	6	3.65	95	192
+380.	Turn armature.	1	4	3	10	6	6	3.24	94	193
+391.	Turn armature.	1	4	2	10	9	4	3.24	94	194
+506.	Check torque converter with test equipment.	4	1	2	8	10	5	3.62	94	195
+340.	Check tire wear.		3	4	12	9	2	3.10	93	196
+465.	Repair a magnetic clutch.	2	4	2	7	11	4	3.32	93	197
+507.	Repair a torque converter.	4	1	2	8	11	4	3.58	93	198
+510.	Do a stall test on a torque converter.	4	2		9	11	4	3.58	93	199
+530.	Demonstrate a basic proficiency in fabrication welding.	2	3	1	10	12	2	3.32	93	200
410.	Repair a diesel transfer pump.	3	4	2	6	9	6	3.41	92	201
+419.	Service and maintain turbochargers.	4	3	2	5	10	6	3.54	92	202
+365.	Determine resistance using ohmmeter.	2	4	4	8	8	4	3.14	88	203
+466.	Repair an expanding shoe clutch.	3	3	1	15	5	3	3.15	85	204
+413.	Test the diesel injection pump.	3	6	5	4	6	6	3.04	82	205
+341.	Diagnose an engine with an oscilloscope analyzer.	1	7	1	15	5	1	2.72	79	206

Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
+529.	Demonstrate a proficiency in arc welding.	1		4	4	3	2	3.23	42
533.	Service and repair chain drives.	2	1	2	3	2	4	3.50	42
+340.	Check tire wear.	1	2	1	5	3	2	3.15	41
+407.	Use an exhaust analyzer.	1	2	2	3	4	2	3.15	41
+413.	Test the diesel injection pump.	2	1	3		6	2	3.42	41
+507.	Repair a torque converter.	1	3	2		6	2	3.15	41
+528.	Demonstrate a basic proficiency in acetylene welding.	1		4	5	2	2	3.15	41
+459.	Service and repair oil coolers.	1	3	2	2	3	3	3.08	40
+383.	Test alternator diodes and replace heat sink.	1	2	3	3	3	2	3.00	39
+506.	Check torque converter with test equipment.	1	3	2	2	4	2	3.00	39
+391.	Turn armature.	2	2	2	2	4	2	3.17	38
+472.	Repair and adjust hydraulic governor.	1	2	3	4	2	2	2.92	38
+341.	Diagnose an engine with an oscilloscope analyzer.	2	2	2	3	3	2	3.08	37
+466.	Repair an expanding shoe clutch.	2	2	2	3	3	2	3.08	37
+530.	Demonstrate a basic proficiency in fabrication welding.	1		6	4	2	1	2.85	37

TABLE 8 --Continued

Comp. No.	Mechanic Competencies Rated by Mechanics N=30	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Mechanic Competencies Rated by Others N=14	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
+407.	Use an exhaust analyzer.	3	6	5	9	3	4	2.78	75	207	+414.	Repair the diesel injection pump.	2	3	2	1	5	1	2.92	35
+441.	Rebuild a piston and install and knurl spacers.	2	7	4	10	5	2	2.68	75	208	+441.	Rebuild a piston and install and knurl spacers.	2	3	3	1	2	3	2.92	35
+414.	Repair the diesel injection pump.	4	7	7	4	4	4	2.65	69	209	+380.	Turn armature.	2	3	2	3	3	1	2.75	33
+445.	Knurl a piston.	4	12	3	9	1	1	2.08	54	210	+445.	Knurl a piston.	3	3	3	2	3		2.45	27

* Competency appears on top 25 percent, both lists.
+ Competency appears on bottom 25 percent, both lists.

A Comparison of Mechanic's Helper Competencies

An equal number of mechanic's helpers and others rated the competencies identified for this job title. Only four of the 13 competencies in the upper 25 percent appeared on both lists. This represents the lowest agreement among the competencies in the upper 25 percent in any job title.

An analysis of the mean rating and the weighted scores shows there are groups of competencies on both lists that were given the same degree of importance. Further review of the data presented in Table 9 indicate only 17 points difference between the top rated competency and the competency with the lowest rating. Thus, one would hypothesize that most competencies are necessary in the job title.

There was somewhat more agreement in the lower 25 percent of competencies with 6 competencies appearing on both lists. One might conclude by reviewing the competencies given the lower ratings that many of the skills are a part of the regular maintanence performed by the owner of the equipment.

TABLE 9

COMPARATIVE RANKING OF MECHANIC'S HELPER COMPETENCIES
GIVEN BY MECHANIC'S HELPERS AND OTHERS

Comp. No.	Mechanic's Helper Competencies Rated by Mech. Helpers N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
*561.	Maintain cleanliness in the work area.					3	4	4.57	32	1
547.	Clean and replace oil in oilbath air cleaners.					4	3	4.43	31	2
553.	Change oil filters.				1	3	3	4.29	30	3
571.	Change oil.				1	3	3	4.29	30	4
572.	Change oil filters.				1	3	3	4.29	30	5
*578.	Test radiator coolant.				1	3	3	4.29	30	6
552.	Drain and refill engine oil.				2	2	3	4.14	29	7
*560.	Clean disassembled components for inspection.				2	2	3	4.14	29	8
576.	Inspect and replace damaged water hoses.				1	4	2	4.14	29	9
*581.	Replace fanbelt.				2	2	3	4.14	29	10
590.	Drain and refill hydraulic systems.				1	4	2	4.14	29	11
543.	Charge or recharge a wet cell battery.				2	3	2	4.00	28	12
544.	Remove, clean and evaluate sparkplugs.				2	3	2	4.00	28	13
546.	Remove, adjust and/or replace fanbelts.				2	3	2	4.00	28	14
554.	Replace radiator hose.				2	3	2	4.00	28	15
579.	Service diesel fuel filters.		1			4	2	4.00	28	16

Comp. No.	Mechanic's Helper Competencies Rated by Others N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
558.	Maintain shop equipment.				1	4	2	4.14	29
559.	Clean machinery prior to disassembly.				1	4	2	4.14	29
*560.	Clean disassembled components for inspection.				1	4	2	4.14	29
*561.	Maintain cleanliness in the work area.				1	4	2	4.14	29
562.	Lubricate machinery.				1	4	2	4.14	29
564.	Clean cylinder blocks.				2	3	2	4.00	28
567.	Operate a steam cleaner.			1		4	2	4.00	28
*578.	Test radiator coolant.			1		4	2	4.00	28
*581.	Replace fanbelt.			1		4	2	4.00	28
582.	Clean battery, cables, terminals and battery box.			1		4	2	4.00	28
583.	Tighten battery cables and battery hold-down.			1		4	2	4.00	28
584.	Treat battery terminals to prevent corrosion.			1		4	2	4.00	28
586.	Add battery water.			1		4	2	4.00	28
550.	Pack wheel bearings.		1			4	2	3.86	27
551.	Install wheel bearings.		1			4	2	3.86	27
552.	Drain and refill engine oil.			1	1	3	2	3.86	27

TABLE 9 --Continued

Comp. No.	Mechanic's Helper Competencies Rated by Mech. Helpers N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
540.	Determine the correct electrolyte level of a battery.				3	2	2	3.86	27	17
549.	Replace fuel filters.				3	2	2	3.86	27	18
550.	Pack wheel bearings.			1	1	3	2	3.86	27	19
555.	Remove carbon from ring grooves.		1		1	2	3	3.86	27	20
558.	Maintain shop equipment.				2	4	1	3.86	27	21
559.	Clean machinery prior to disassembly.				2	4	1	3.86	27	22
580.	Determine condition of fanbelt.				3	2	2	3.86	27	23
582.	Clean battery, cables, terminals and battery box.				3	2	2	3.86	27	24
586.	Add battery water.				3	2	2	3.86	27	25
573.	Bleed brake lines.			1	2	2	2	3.71	26	26
583.	Tighten battery cables and battery hold-down.				3	3	1	3.71	26	27
584.	Treat battery terminals to prevent corrosion.				3	3	1	3.71	26	28
545.	Regap and test sparkplugs.			1	2	3	1	3.57	25	29
551.	Install wheel bearings.			2		4	1	3.57	25	30
587.	Activate dry-charged batteries.			1	2	3	1	3.57	25	31
588.	Drain and refill transmissions.				4	2	1	3.57	25	32
589.	Drain and refill differentials.				4	2	1	3.57	25	33

Comp. No.	Mechanic's Helper Competencies Rated by Others N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
553.	Change oil filters.			1	1	3	2	3.86	27
554.	Replace radiator hose.			1	1	3	2	3.86	27
556.	Clean oil passages.		1			4	2	3.86	27
565.	Remove piston rings.		1			4	2	3.86	27
566.	Clean pistons.		1			4	2	3.86	27
571.	Change oil.			1	1	3	2	3.86	27
572.	Change oil filters.			1	1	3	2	3.86	27
576.	Inspect and replace damaged water hoses.			1	1	3	2	3.86	27
577.	Test thermostats.			1	1	3	2	3.86	27
579.	Service diesel fuel filters.			1	1	3	2	3.86	27
580.	Determine condition of fanbelt.			1	1	3	2	3.86	27
585.	Check specific gravity of electrolyte.		1			4	2	3.86	27
588.	Drain and refill transmissions.		1			4	2	3.86	27
543.	Charge or recharge a wet cell battery.		1		1	3	2	3.71	26
544.	Remove, clean and evaluate sparkplugs.		1		1	3	2	3.71	26
545.	Regap and test sparkplugs.		1		1	3	2	3.71	26
546.	Remove, adjust and/or replace fanbelts.		1		1	3	2	3.71	26

TABLE 9 --Continued

Comp. No.	Mechanic's Helper Competencies Rated by Mech. Helpers N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
591.	Replace hydraulic filters.			1	3	1	2	3.57	25	34
541.	Use a hydrometer to determine the specific gravity of a battery.			2	1	3	1	3.43	24	35
548.	Clean a dry element air cleaner.			2	1	3	1	3.43	24	36
562.	Lubricate machinery.			1	2	4		3.43	24	37
566.	Clean pistons.			1	2	4		3.43	24	38
569.	Clean fuel lines.			2	1	3	1	3.43	24	39
585.	Check specific gravity of electrolyte.	1			1	4	1	4.00	24	40
+563.	Clean and flush a cooling system.		1		3	2	1	3.29	23	41
564.	Clean cylinder blocks.			1	3	3		3.29	23	42
+568.	Clean and flush fuel tanks.		1	1	1	3	1	3.29	23	43
+570.	Replace ignition wires.		1	1	1	3	1	3.29	23	44
+575.	Replace cooling system thermostat.			1	4	1	1	3.29	23	45
577.	Test thermostats.		1	1	1	3	1	3.29	23	46
565.	Remove piston rings.		1	1	2	2	1	3.14	22	47
+542.	Determine the battery voltage using a voltmeter.			3	2	1	1	3.00	21	48
557.	Bleed a diesel fuel system.	2			1	2	2	4.20	21	49

Comp. No.	Mechanic's Helper Competencies Rated by Others N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
547.	Clean and replace oil in oilbath air cleaners.		1		1	3	2	3.71	26
548.	Clean a dry element air cleaner.		1		1	3	2	3.71	26
549.	Replace fuel filters.		1		1	3	2	3.71	26
555.	Remove carbon from ring grooves.		1		1	3	2	3.71	26
557.	Bleed a diesel fuel system.		1		1	3	2	3.71	26
569.	Clean fuel lines.		1		1	3	2	3.71	26
+570.	Replace ignition wires.		1		1	3	2	3.71	26
+575.	Replace cooling system thermostat.		1		1	3	2	3.71	26
587.	Activate dry-charged batteries.		1		1	3	2	3.71	26
589.	Drain and refill differentials.		1		1	3	2	3.71	26
591.	Replace hydraulic filters.		1		1	3	2	3.71	26
+542.	Determine the battery voltage using a voltmeter.		1	1		3	2	3.57	25
573.	Bleed brake lines.			1	2	3	1	3.57	25
590.	Drain and refill hydraulic systems.		1		2	2	2	3.57	25
540.	Determine the correct electrolyte level of a battery.		1		2	3	1	3.43	24
541.	Use a hydrometer to determine the specific gravity of a battery.		2		1	2	2	3.29	23

TABLE 9--Continued

Comp. No.	Mechanic's Helper Competencies Rated by Mech. Helpers N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Mechanic's Helper Competencies Rated by Others N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
556.	Clean oil passages.	1	1	1	1	1	2	3.33	20	50	+568.	Clean and flush fuel tanks.	1		1	1	3	1	3.67	22
567.	Operate a steam cleaner.		1	1	3	2		2.86	20	51	+563.	Clean and flush a cooling system.	1	1		2	2	1	3.33	20
+574.	Test radiator pressure caps.		3		2	2		2.43	17	52	+574.	Test radiator pressure caps.	1	2		2	2		2.67	16

* Competency appears on top 25 percent, both lists.
+ Competency appears on bottom 25 percent, both lists.

A Comparison of Painter Competencies

Ten people responded to the list of competencies for the painter but only 2 persons were classified as painters. Thus, the ranking of all respondents were grouped into one list. In the majority of the machinery dealerships, the mechanic or mechanic's helper did the painting.

The importance of caring for painting equipment is evident by the fact that "maintain spraying equipment" and "operate spray gun equipment" were given the highest ranking. A further review of the five top rated competencies shows a minimal difference in mean rating and weighted scores. It is also interesting to note that the second five of the first 10 competencies were given the same weighted score and have the same mean rating.

An examination of the competencies, particularly those given the lowest rankings seemed to indicate less need to do extensive repair work such as that done in an auto body shop.

TABLE 10

RANK ORDER OF PAINTER COMPETENCIES
GIVEN BY PAINTERS AND OTHERS

Rank Order No.	Comp. No.	Painter Competencies Rated by Others N=10	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
1	625.	Maintain spraying equipment.				2	1	7	4.50	45
2	612.	Operate spray gun equipment.				2	2	6	4.40	44
3	601.	Follow directions when mixing paint.				2	4	4	4.20	42
4	616.	Use enamel paints.			1	2	2	5	4.10	41
5	600.	Operate a steam cleaner.		1		1	4	4	4.00	40
6	602.	Operate a power sander and grinder.			2	2	4	2	3.60	36
7	615.	Thin paint.			3	1	3	3	3.60	36
8	620.	Prepare metal surfaces for priming.			3	1	3	3	3.60	36
9	624.	Use grease removers.			3	2	1	4	3.60	36
10	626.	Repair spraying equipment.			1	5	1	3	3.60	36

TABLE 10--Continued

Rank Order No.	Comp. No.	Painters Competencies Rated by Others N=10	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
11	604.	Operate a high pressure washer.	1	1		2	2	4	3.89	35
12	619.	Use masking materials.			3	2	2	3	3.50	35
13	621.	Select and use thinners properly.		1	2	1	3	3	3.50	35
14	627.	Do touch-up painting.		1	1	3	2	3	3.50	35
15	606.	Identify broken and badly worn parts.		2	2		2	4	3.40	34
16	608.	Operate an acetylene torch.			2	6		2	3.20	32
17	605.	Operate heavy duty jack.		2		5	1	2	3.10	31
18	622.	Select and use reducers properly.		1	3	2	2	2	3.10	31
19	603.	Use chemicals to remove paint.		2	2	3		3	3.00	30
20	628.	Maintain air compressing equipment.		2	2	3	1	2	2.90	29
21	610.	Do general acetylene welding.			6	2		2	2.80	28

TABLE 10--Continued

Rank Order No.	Comp. No.	Painters Competencies Rated by Others N=10	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
22	617.	Use lacquer paints.	2		3	1	1	3	3.50	28
23	609.	Braze metal.		1	5	2		2	2.70	27
24	618.	Use acrylic paints.	2	2		2	1	3	3.37	27
25	611.	Do general arc welding.		2	4	2	1	1	2.50	25
26	623.	Use metal conditioners.		3	2	3	1	1	2.50	25
27	607.	Use body fillers.	1	2	3	2		2	2.67	24
28	614.	Match paints.	3	1	2	1	1	2	3.14	22
29	629.	Repair air compressing equipment.	1	4	1	3		1	2.22	20
30	613.	Operate a sand blasting machine.	5	2		3			2.20	11

A Comparison of Welder Competencies

As explained earlier, a 0 rating on the welder competencies implies that the tasks were performed outside the farm machinery business. One would hypothesize from a review of the competencies identified for this job title that most employees who perform welding skills in the machinery dealerships do not perform highly specialized welding processes. This is evidenced by the fact that both groups of respondents agreed on 20 of the 23 competencies in the lower 25 percent, all of which dealt with some types of specialized welding. It will also be noted that a large number of the employee respondents gave those competencies in the lower 25 percent a 0 rating indicating the competencies were not performed in the dealership. This hypothesis is further supported by the fact that the 15 competencies which both groups agreed upon in the upper 25 percent were those competencies normally considered as being basic welding skills.

TABLE 11

COMPARATIVE RANKING OF WELDER COMPETENCIES
GIVEN BY WELDERS AND OTHERS

Comp. No.	Welder Competencies Rated by Welders N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
*669.	Select the proper electrodes for all types of arc welding.				2	1	4	4.29	30	1
*635.	Assembly oxyacetylene welding equipment.				2	2	3	4.14	29	2
*636.	Adjust acetylene torch to neutral, carbuerized and oxidized flame.				2	2	3	4.14	29	3
*674.	Arc weld on vertical surfaces.				2	3	2	4.00	28	4
646.	Weld in overhead positions.			1	1	3	2	3.86	27	5
647.	Braze ferrous (iron) materials.			1	1	3	2	3.86	27	6
645.	Weld in vertical positions.			1	2	2	2	3.71	26	7
* 657.	Cut thin steel with an acetylene cutting torch.			2	1	1	3	3.71	26	8
* 661.	Pierce and cut holes.			2		3	2	3.71	26	9
* 675.	Arc weld overhead.				3	3	1	3.71	26	10
643.	Make a fillet weld.			2	1	2	2	3.57	25	11
* 658.	Cut thick steel with acetylene torch.			2		4	1	3.57	25	12
* 659.	Cut chamfers (bevels) with acetylene torch.			2		4	1	3.57	25	13
* 673.	Arc weld in flat position.				4	2	1	3.57	25	14

Comp. No.	Welder Competencies Rated by Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
*636.	Adjust acetylene torch to neutral, carbuerized and oxidized flame.				1	5	3	4.22	38
*657.	Cut thin steel with an acetylene cutting torch.					5	3	4.22	38
*658.	Cut thick steel with acetylene torch.				1	5	3	4.22	38
*659.	Cut chamfers (bevels) with acetylene torch.				1	6	2	4.11	37
660.	Cut pipe.				1	6	2	4.11	37
*661.	Pierce and cut holes.				1	6	2	4.11	37
*669.	Select the proper electrodes for all types of arc welding.				1	6	2	4.11	37
731.	Operate power grinders.				1	6	2	4.11	37
*673.	Arc weld in flat position.			1		6	2	4.00	36
670.	Arc weld lap joint in flat position.			1		7	1	3.89	35
671.	Arc weld corner joint in flat position.			1		7	1	3.89	35
672.	Arc weld T-joint in flat position.			1		7	1	3.89	35
*674.	Arc weld on vertical surfaces.			1		7	1	3.89	35
729.	Operate drill presses.			1	1	5	2	3.89	35

TABLE 11 --Continued

Comp. No.	Welder Competencies Rated by Welders N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Welder Competencies Rated by Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
*678.	Prepare ferrous (iron) metal for arc and acetylene welding.		1		2	2	2	3.57	25	15	*730.	Sharpen hand metal working tools.			1		7	1	3.89	35
705.	Arc weld cast iron.			2	1	2	2	3.57	25	16	668.	Operate a transformer type AC welder.			1	1	6	1	3.78	34
*730.	Sharpen hand metal working tools.			2	1	2	2	3.57	25	17	*675.	Arc weld overhead.			1	1	6	1	3.78	34
*640.	Make butt joint welds.			2	2	1	2	3.43	24	18	725.	Operate power grinders.	1			1	5	2	3.78	34
*641.	Make lap joint welds.			2	2	1	2	3.43	24	19	*635.	Assemble oxyacetylene welding equipment.		1	1		5	2	3.67	33
642.	Make outside corner welds.			2	2	1	2	3.43	24	20	*641.	Make lap joint welds.			1	2	5	1	3.67	33
654.	Braze weld cast.			2	2	1	2	3.43	24	21	644.	Weld in flat positions.			1	2	5	1	3.67	33
666.	Operate a DC motor driven welder.			1	3	2	1	3.43	24	22	*678.	Prepare ferrous (iron) metal for arc and acetylene welding.			2		6	1	3.67	33
*639.	Make acetylene welds with filler rod.			2	2	2	1	3.29	23	23	*639.	Make acetylene welds with filler rod.			1	3	4	1	3.56	32
649.	Apply hardfacing materials.			1	4	1	1	3.29	23	24	*640.	Make butt joint welds.			2	1	5	1	3.56	32
668.	Operate a transformer type AC welder.			2	2	2	1	3.29	23	25	645.	Weld in vertical positions.			1	3	4	1	3.56	32
671.	Arc weld corner joint in flat position.					5	2	3.29	23	26	655.	Braze ferrous (iron) metal.			1	3	4	1	3.56	32
672.	Arc weld T-joint in flat position.					5	2	3.29	23	27	705.	Arc weld cast iron.	1			2	5	1	3.56	32
729.	Operate drill presses.			2	3		2	3.29	23	28	712.	Determine the physical properties of iron and steel.			1	3	5		3.44	31
644.	Weld in flat positions.	1		1	2	1	2	3.67	22	29	713.	Determine the nature (identification) of iron and steel by the spark test.			1	3	5		3.44	31
670.	Arc weld lap joint in flat position.			1	4	2		3.14	22	30	642.	Make outside corner welds.		1	1	2	4	1	3.33	30

TABLE 11--Continued

Comp. No.	Welder Competencies Rated by Welders N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
677.	Prepare non-ferrous (non-iron) metal for arc and acetylene welding.		1	1	2	2	1	3.14	22	31
704.	Weld galvanized steel.			2	3	1	1	3.14	22	32
712.	Determine the physical properties of iron and steel.	1		1	2	1	2	3.67	22	33
714.	Understand the nature and use of iron and steel alloys.		1	1	3		2	3.14	22	34
731.	Operate power grinders.			3	2		2	3.14	22	35
655.	Braze ferrous (iron) metal.			3	2	1	1	3.00	21	36
660.	Cut pipe.			3	2	1	1	3.00	21	37
710.	Perform sheet metal fabrication.			3	2	1	1	3.00	21	38
725.	Operate power grinders.			3	2	1	1	3.00	21	39
638.	Make acetylene welds without the use of welding rod.			4	1	1	1	2.86	20	40
713.	Determine the nature (identification) of iron and steel by the spark test.	1		1	3	1	1	3.33	20	41
715.	Classify ferrous or non-ferrous metals.		1	1	4		1	2.86	20	42
648.	Braze non-ferrous (non-iron) materials.	1	1		3	1	1	3.17	19	43
656.	Braze non-ferrous (non-iron) metal.			3	3	1		2.71	19	44
697.	Weld low carbon alloy metal.	1		2	2	1	1	3.17	19	45

Comp. No.	Welder Competencies Rated by Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
643.	Make fillet weld.		1	1	2	4	1	3.33	30
710.	Perform sheet metal fabrication.		1	1	2	5		3.22	29
711.	Perform heavy steel fabrication.		1		4	4		3.22	29
723.	Operate a power hacksaw.		1	2	1	4	1	3.22	29
646.	Weld in overhead positions.			3	3	2	1	3.11	28
647.	Braze ferrous (iron) materials.			2	5	1	1	3.11	28
654.	Braze weld cast.		2		3	3	1	3.20	28
715.	Classify ferrous or non-ferrous metals.		1	1	3	4		3.11	28
714.	Understand the nature and use of iron and steel alloys.		1	1	4	3		3.00	27
709.	Do pipe and tube welding.		2		4	3		2.89	26
648.	Braze non-ferrous (non-iron) materials.				3	5	1	2.78	25
728.	Read welding symbols.		2	1	3	3		2.78	25
666.	Operate a DC motor driven welder.		2	2	2	3		2.67	24
667.	Operate a rectifier type AC-DC arc welder.		2	1	4	2		2.67	24
677.	Prepare non-ferrous (non-iron) metal for arc and acetylene welding.		2	3	1	3		2.56	23

TABLE 11--Continued

Comp. No.	Welder Competencies Rated by Welders N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
711.	Perform heavy steel fabrication.			4	2		1	2.71	19	46
637.	Operate an acetylene generator.	1	1	1	2	1	1	3.00	18	47
650.	Braze with silver alloys.	1		1	4	1		3.00	18	48
651.	Braze on stainless steel.	1		2	2	2		3.00	18	49
676.	Carbon arc weld.		1	3	1	2		2.57	18	50
709.	Do pipe and tube welding.	1		1	4	1		3.00	18	51
728.	Read welding symbols.	1		2	3		1	3.00	18	52
667.	Operate a rectifier type AC-DC arc welder.	1	1	1	2	2		2.83	17	53
718.	Temper steel.	1	2		2	1	1	2.83	17	54
722.	Operate an abrasive cut-off machine.	1		3	2		1	2.83	17	55
727.	Read blueprints.	1		3	2		1	2.83	17	56
652.	Low temperature weld aluminum.	1		3	2	1		2.67	16	57
663.	Perform carbon arc cutting.	1	1	2	1	2		2.67	16	58
703.	Weld tool and die steel.	1	2	1	1	1	1	2.67	16	59
717.	Harden steel.	1	2		2	2		2.67	16	60
664.	Perform metal electrode arc cutting.	1	2	1	1	2		2.50	15	61
665.	Perform air arc cutting.	1	2	1	2	1		2.33	14	62

Comp. No.	Welder Competencies Rated by Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
704.	Weld galvanized steel.		3	1	3	1	1	2.56	23
722.	Operate an abrasive cut-off machine.	1	2	1	1	4		2.87	23
656.	Braze non-ferrous (non-iron) metal.		3	2	3	1		2.22	20
649.	Apply hardfacing materials.		2	5	1	1		2.11	19
637.	Operate an acetylene generator.		4	3		2		2.00	18
638.	Make acetylene welds without the use of welding rod.		3	3	3			2.00	18
697.	Weld low carbon alloy metal.		3	4	1	1		2.00	18
664.	Perform metal electrode arc welding.		3	5		1		1.89	17
727.	Read blueprints.	1	4	1	1	2		2.12	17
662.	Operate an automatic cutting device.		4	4		1		1.78	16
701.	Weld low carbon molybdenum steel.		5	2	1	1		1.78	16
703.	Weld tool and die steel.		5	2	1	1		1.78	16
708.	Arc weld brass.		6	1	1	1		1.67	15
721.	Operate a power shear.		6	1	1	1		1.67	15
676.	Carbon arc weld.		5	3	1			1.56	14
718.	Temper steel.	1	4	2	2			1.75	14
681.	Maintain inert gas welding equipment.	1	5	1	2			1.62	13

TABLE 11--Continued

Comp. No.	Welder Competencies Rated by Welders N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Welder Competencies Rated by Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
689.	Seam weld.	3		1	1	1	1	3.50	14	63	716.	Anneal and/or normalize steel.	2	2	4	1			1.86	13
698.	Weld chromium steel.	1	1	3	1	1		2.33	14	64	720.	Stress relieve steel.			6	2	1		1.44	13
716.	Anneal and/or normalize steel.		3	1	3			2.00	14	65	650.	Braze with silver alloys.			6	3			1.33	12
723.	Operate a power hacksaw.	1		4	2			2.33	14	66	651.	Breze on stainless steel.			6	3			1.33	12
662.	Operate an automatic cutting device.	1	2	2	1	1		2.17	13	67	663.	Perform carbon arc cutting.			6	3			1.33	12
684.	Spot weld.	3		2		1	1	3.25	13	68	702.	Weld chrome-moly steel.			7	1	1		1.33	12
708.	Arc weld brass.	1	1	3	2			2.17	13	69	706.	Arc weld cast aluminum.			7	1	1		1.33	12
720.	Stress relieve steel.	1	2	1	3			2.17	13	70	717.	Harden steel.	1	4	4				1.50	12
653.	Low temperature weld magnesium.	2		3	2			2.40	12	71	665.	Perform air arc cutting.			8		1		1.22	11
706.	Arc weld cast aluminum.	1	1	4	1			2.00	12	72	684.	Spot weld.	1	7				1	1.37	11
707.	Arc weld copper.	1	1	4	1			2.00	12	73	689.	Seam weld.	2	5	1		1		1.57	11
+719.	Caseharden steel.	1	2	2	2			2.00	12	74	698.	Weld chromium steel.			7	2			1.22	11
721.	Operate a power shear.	1	1	4	1			2.00	12	75	+699.	Weld nickel-chromium stainless steel.			7	2			1.22	11
701.	Weld low carbon molybdenum steel.	1	2	3	1			1.83	11	76	+700.	Weld chrome-nickel molybdenum steel.			7	2			1.22	11
+726.	Operate a notching machine.	1	2	3	1			1.83	11	77	707.	Arc weld copper.			8		1		1.22	11
+699.	Weld nickel-chromium stainless steel.	1	2	4				1.67	10	78	652.	Low temperature weld aluminum.			8	1			1.11	10
+700.	Weld chrome-nickel molybdenum steel.	1	2	4				1.67	10	79	+679.	Perform gas tungsten-arc welding (TIG).	1	6	2				1.25	10
702.	Weld chrome-moly steel.	1	2	4				1.67	10	80	+680.	Perform gas metal-arc welding (MIG).	1	6	2				1.25	10
+724.	Operate a forge.	1	2	4				1.67	10	81	+685.	Gun weld.	1	7			1		1.25	10

TABLE 11--Continued

Comp. No.	Welder Competencies Rated by Welders N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
+682.	Repair inert gas welding equipment.	2	3	1			1	1.80	9	82
+686.	Shot weld.	4		1	1	1		3.00	9	83
+690.	Projection weld.	4		1	1	1		3.00	9	84
+691.	Spike weld.	4		1	1	1		3.00	9	85
+692.	Stud weld.	4		1	1	1		3.00	9	86
681.	Maintain inert gas welding equipment.	3	2	1			1	2.00	8	87
+683.	Operate a consumable wire electrode unit (MIG) and/or cored wire.	3	2	1			1	2.00	8	88
+685.	Gun weld.	4		2			1	2.67	8	89
+679.	Perform gas tungsten-arc welding (TIG).	4	1	1			1	2.33	7	90
+680.	Perform gas metal-arc welding (MIG).	4	1	1			1	2.33	7	91
+687.	Upset weld.	5		1			1	3.00	6	92
+688.	Flash weld.	5		1			1	3.00	6	93
+693.	Metal foil weld.	4	1	1	1			2.00	6	94
+694.	Metal fiber weld.	4	1	1	1			2.00	6	95
+695.	Percussion weld.	4	1	1	1			2.00	6	96
+696.	High frequency resistance weld.	4	1	2				1.67	5	97

Comp. No.	Welder Competencies Rated by Others N=9	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
+692.	Stud weld.	1	6	2				1.25	10
+719.	Caseharden steel.	1	6	2				1.25	10
653.	Low temperature weld magnesium.		9					1.00	9
+682.	Repair inert gas welding equipment.	1	7	1				1.12	9
+683.	Operate a consumable wire electrode unit (MIG) and/or cored wire.	1	7	1				1.12	9
+686.	Shot weld.	2	6		1			1.29	9
+726.	Operate a notching machine.	3	5			1		1.50	9
+687.	Upset weld.	2	6	1				1.14	8
+688.	Flash weld.	2	6	1				1.14	8
+690.	Projection weld.	2	6	1				1.14	8
+691.	Spike weld.	2	6	1				1.14	8
+693.	Metal foil weld.	2	6	1				1.14	8
+694.	Metal fiber weld.	2	6	1				1.14	8
+695.	Percussion weld.	2	6	1				1.14	8
+696.	High frequency resistance weld.	2	6	1				1.14	8
+724.	Operate a forge.	1	8					1.00	8

* Competency appears on top 25 percent, both lists.
+ Competency appears on bottom 25 percent, both lists.

A Comparison of Maintenance Man Competencies

The competencies required of those working as maintenance men are quite varied in nature. Many of the competencies required of those working in this job title relate to or are similar to the less complicated competencies performed by the machinery mechanic.

Five of the 8 competencies ranked in the upper and lower 25 percent of the competencies appear in both lists. All five of the competencies agreed upon by both groups of respondents related to driving and maintaining a truck.

All respondents agreed on the two competencies that were of least importance, "repair truck tires," and "take an annual inventory." If these two competencies were removed from the list there would be a rather narrow spread among the weighted scores for those competencies at the upper and lower end of the continuum. This would tend to indicate that the job of a maintenance man is rather well defined.

TABLE 12

COMPARATIVE RANKING OF MAINTENANCE MAN COMPETENCIES
GIVEN BY MAINTENANCE MEN AND OTHERS

Comp. No.	Maintenance Man Competencies Rated by Maintenance Men N=8	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
746.	Assemble farm machinery.				1	3	4	4.38	35	1
764.	Load a truck properly.				1	3	4	4.38	35	2
*767.	Follow all safety rules related to driving a truck.				1	3	4	4.38	35	3
*768.	Keep truck tires properly inflated.				1	3	4	4.38	35	4
752.	Operate a tractor.				2	2	4	4.25	34	5
*765.	Drive a truck properly.				2	2	4	4.25	34	6
*766.	Maintain truck safety equipment.				2	2	4	4.25	34	7
*743.	Perform emergency road repairs.				2	3	3	4.12	33	8
770.	Recognize faulty truck operation.				3	1	4	4.12	33	9
740.	Operate light duty trucks.				3	2	3	4.00	32	10
742.	Inspect and service light duty trucks.			1	1	3	3	4.00	32	11
760.	Repair farm machinery.				4		4	4.00	32	12
761.	Perform minor adjustments of farm machinery.				3	2	3	4.00	32	13
763.	Lubricate and service a truck.				2	4	2	4.00	32	14
741.	Load and unload trucks.			1	2	2	3	3.88	31	15
762.	Replace worn machinery parts.				3	3	2	3.88	31	16

Comp. No.	Maintenance Man Competencies Rated by Others N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
*767.	Follow all safety rules related to driving a truck.				1		6	4.71	33
740.	Operate light duty trucks.				1	1	5	4.57	32
742.	Inspect and service light duty trucks.			1			6	4.57	32
*765.	Drive a truck properly.				1	1	5	4.57	32
*766.	Maintain truck safety equipment.				1	1	5	4.57	32
*768.	Keep truck tires properly inflated.				1	1	5	4.57	32
770.	Recognize faulty truck operation.				1	1	5	4.57	32
*743.	Perform emergency road repairs.			1		1	5	4.43	31
753.	Charge a battery.			1		1	5	4.43	31
754.	Change oil and grease vehicles and tractors.			1		1	5	4.43	31
758.	Maintain vehicles and tractors.				2		5	4.43	31
764.	Load a truck properly.				2		5	4.43	31
741.	Load and unload trucks.				2	1	4	4.29	30
752.	Operate a tractor.			1		2	4	4.29	30
759.	Perform minor tune-up of vehicles and tractors.			1	1		5	4.29	30
763.	Lubricate and service a truck.			1	1		5	4.29	30

TABLE 12--Continued

Comp. No.	Maintenance Man Competencies Rated by Maintenance Man N=8	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
749.	Obtain a chauffeur's license.	1		1		2	4	4.29	30	17
751.	Change tires.			1	2	3	2	3.75	30	18
754.	Change oil and grease vehicles and tractors.			1	2	3	2	3.75	30	19
758.	Maintain vehicles and tractors.			1	2	3	2	3.75	30	20
759.	Perform minor tune-up of vehicles and tractors.			1	2	3	2	3.75	30	21
745.	Verify load against a bill of lading.	1			2	2	3	4.14	29	22
750.	Operate a steam cleaner.				4	3	1	3.62	29	23
755.	Clean and sharpen hand tools.			1	3	2	2	3.62	29	24
+756.	Order repair parts for vehicles and/or other equipment.			2		5	1	3.62	29	25
+747.	Operate a forklift.			1	3	3	1	3.50	28	26
753.	Charge a battery.				5	2	1	3.50	28	27
748.	Prepare a receipt for merchandise picked up.			1	6		1	3.13	25	28
+744.	Crate parts for shipment.	1		2	3	2		3.00	21	29
+757.	Take an annual inventory.	1	3		2		2	2.71	19	30
+769.	Repair truck tires.	1	2	1	2	1	1	2.71	19	31

Comp. No.	Maintenance Man Competencies Rated by Others N=7	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
745.	Verify load against bill of lading.		1		1		5	4.14	29
750.	Operate a steam cleaner.			1		3	3	4.14	29
748.	Prepare a receipt for merchandise picked up.		1	1			5	4.00	28
755.	Clean and sharpen hand tools.			2		1	4	4.00	28
751.	Change tires.		1	1		1	4	3.86	27
760.	Repair farm machinery.		1	1		1	4	3.86	27
761.	Perform minor adjustments of farm machinery.		1	1		1	4	3.86	27
762.	Replace worn machinery parts.		1	1		1	4	3.86	27
746.	Assemble farm machinery.		1		2	1	3	3.71	26
749.	Obtain a chauffeur's license.			1	1	1	4	3.71	26
+747.	Operate a forklift.	1			1	1	4	4.17	25
+744.	Crate parts for shipment.		1		3	1	2	3.43	24
+756.	Order repair parts for vehicles and/or other equipment.			2	3		2	3.29	23
+769.	Repair truck tires.			3			2	2	3.00	21
+757.	Take an annual inventory.	1	1	2	1		2	3.00	18

* Competency appears on top 25 percent, both lists.
+ Competency appears on bottom 25 percent, both lists.

A Comparison of Set-Up Man Competencies

Twenty competencies were identified for the set-up man. Sixteen set-up men and 16 others ranked the competencies. There was total agreement on the first 5 or upper 25 percent of the competencies. Each of the five competencies are directly related to putting equipment together and getting it ready for field use. The fact that there was full agreement on these 5 competencies may mean that the set-up man is spending full time performing these general tasks.

It is interesting to note the set-up men and others agreed on only one competency in the lower 25 percent. The competency, "spray paint," was ranked lowest by both groups.

TABLE 13

COMPARATIVE RANKING OF SET-UP MAN COMPETENCIES
GIVEN BY SET-UP MEN AND OTHERS

Comp. No.	Set-Up Man Competencies Rated by Set-Up Men N=16	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.
*778.	Properly load and unload equipment from trucks and flat cars.				1	4	11	4.62	74	1
*781.	Carry out pre-delivery service					6	10	4.62	74	2
*782.	Carry out delivery service.				1	4	11	4.62	74	3
*779.	Follow assembly procedure prescribed by the manufacturer.				1	6	9	4.50	72	4
*780.	Read and follow technical manuals.			1	1	6	8	4.31	69	5
794.	Demonstrate a working knowledge of adjustment and maintenance of crop harvesting equipment.			1	3	5	7	4.12	66	6
77[illegible].	Operate air powered tools.		1		3	5	7	4.06	65	7
784.	Analyze damage caused by carriers.				5	5	6	4.06	65	8
775.	Operate overhead hoist.			1	4	6	5	3.94	63	9
785.	Match shipment against freight bill.	1			3	7	5	4.13	62	10
793.	Demonstrate a working knowledge of adjustment and maintenance of tillage, planting, spraying and fertilizing machinery.		1	2	2	4	7	3.88	62	11
790.	Operate diesel engines.			2	4	7	3	3.69	59	12
792.	Demonstrate a working knowledge of hydraulic power transfer systems.			2	5	5	4	3.69	59	13

Comp. No.	Set-Up Man Competencies Rated by Others N=16	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
*779.	Follow assembly procedure prescribed by the manufacturer.				2	5	9	4.44	71
*780.	Read and follow technical manuals.				2	6	8	4.38	70
*782.	Carry out delivery service.			1	2	4	9	4.31	69
*778.	Properly load and unload equipment from trucks and flat cars.				3	6	7	4.25	68
*781.	Carry out pre-delivery service.	1	1		1	4	9	4.33	65
789.	Operate large gasoline engines.			2	3	5	6	3.94	63
790.	Operate diesel engines.			2	3	5	6	3.94	63
784.	Analyze damage caused by carriers.		1	1	2	9	3	3.75	60
788.	Operate small gasoline engines.			3	3	5	5	3.75	60
777.	Operate air powered tools.		2	1	2	6	5	3.69	59
775.	Operate overhead hoist.	1	1	1	4	3	6	3.80	57
785.	Match shipment against freight bill.		3		4	4	5	3.50	56
776.	Operate fork lift.	2	1		4	4	5	3.86	54

TABLE 13--Continued

Comp. No.	Set-Up Man Competencies Rated by Set-Up Men N=16	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score	Rank Order No.	Comp. No.	Set-Up Man Competencies Rated by Others N=16	Frequency 0	1	2	3	4	5	Mean Rating	Wtd. Score
783.	Service equipment in the field.		3		3	5	5	3.56	57	14	793.	Demonstrate a working knowledge of adjustment and maintenance of tillage, planting, spraying and fertilizing machinery.		1	2		4	5	4	3.60	54
791.	Demonstrate a working knowledge of mechanical power transfer systems.			4	5	4	3	3.37	54	15	786.	Conduct an inventory.		1	1	1	6	3	4	3.53	53
789.	Operate large gasoline engines.			5	3	6	2	3.31	53	16	792.	Demonstrate a working knowledge of hydraulic power transfer systems.		1	2		6	3	4	3.47	52
786.	Conduct an inventory.		3	2	3	6	2	3.13	50	17	794.	Demonstrate a working knowledge of adjustment and maintenance of crop harvesting equipment.		1	2		4	7	2	3.47	52
788.	Operate small gasoline engines.		2	4	3	5	2	3.06	49	18	791.	Demonstrate a working knowledge of mechanical power transfer systems.		1	1	2	5	4	3	3.40	51
776.	Operate fork lift.	1	4	1	3	2	5	3.20	48	19	783.	Service equipment in the field.		1	3	2	2	5	3	3.20	48
+787.	Spray paint.	1	1	5	5	2	2	2.93	44	20	+787.	Spray paint.			3	4	6	1	2	2.69	43

* Competency appears on top 25 percent, both lists.
+ Competency appears on bottom 25 percent, both lists.

Summary of Findings

This part of the report is a partial summary of the findings. A careful review of data arrayed in the tables of this report will reveal many findings with implications for curriculum development. The following are general findings relating to the competencies identified with the 12 job titles common to Montana farm machinery dealerships.

Manager Job Title

1. Those competencies relating to a person's willingness to work and ability to get along with people were rated high by the 36 managers rating the 51 competencies within his job title.
2. There was a tendency to give a high rating to those competencies evolved around an understanding of and the ability to apply good business principles.
3. Those competencies relating to running the business were generally rated higher than those competencies related to an understanding of agricultural practices and the function of the equipment being sold by the dealership.

Supervisor Job Title

1. Both groups of respondents agreed on only 4 of the 10 competencies that appeared in the upper 25 percent, while both groups agreed on 5 competencies in the lower 25 percent.

2. Numerous competencies relating to a supervisor's ability to get along with and direct the activities of employees were rated high by both employee and other respondents.
3. The employee respondents generally gave a higher rating to those competencies related to the actual operation of the equipment being serviced than did the other respondents.

Salesman Job Title

1. Both groups of respondents agreed on 14 of the 22 competencies in the upper 25 percent.
2. Both groups of respondents agreed on 16 of the 22 competencies in the lower 25 percent.
3. The greatest number of competencies in the upper 25 percent dealt with a salesman's ability to maintain a continuous, satisfactory relationship with the customer.
4. Both groups of respondents gave a lower rating to those competencies relating to the actual operation of farm equipment.
5. Both groups of respondents gave lower ratings to those competencies relating to an understanding of agriculture cultural practices.

Parts Man Job Title

1. Both groups of respondents agreed on only 5 of the 11 competencies in the upper 25 percent.
2. Those competencies in the upper 25 percent, upon which both groups agreed, dealt with identifying, locating, pricing and preparing a sales receipt for parts requested by customers.

3. Both groups of respondents gave a lower rating to those competencies relating to the actual understanding of the equipment he would be selling. Seven of the competencies in the lower 25 percent upon which both groups agreed related to these types of competencies.

Office Worker Job Title

1. Both groups of respondents agreed on 5 of the 8 competencies ranked in the upper 25 percent. All 25 of these competencies related to actual skills of maintaining the company books.
2. Both groups of respondents agreed on 5 of the 8 competencies ranked in the lower 25 percent.
3. Both groups gave a lower ranking to the competencies, "act as a receptionist" and "operate office machines."
4. In addition to competencies relating to the maintenance of company books, office workers are responsible for maintaining extensive employee records.

Technician Job Title

1. Nineteen of the 33 competencies related to the job title were not performed in one or more of the businesses surveyed.
2. Both groups of respondents agreed on 6 of the 8 competencies in the upper 25 percent.
3. Both groups agreed upon 7 out of the 8 competencies in the lower 25 percent.

4. All of those competencies ranked in the lower 25 percent were ranked very low or the respondents indicated the tasks were performed outside the dealership.
5. Those competencies ranked low by both groups of respondents are those requiring the services of highly skilled workers and very experienced equipment.

Mechanic Job Title

1. The largest number of competencies (210) were identified as being related to the job of a mechanic.
2. Both groups of respondents agreed on 25 of the 53 competencies in the upper 25 percent.
3. Both groups of respondents agreed on 38 of the 53 competencies in the lower 25 percent.
4. Both groups of respondents gave the highest rating to the competency, "read technical service manauals," and the lowest importance rating to the competency, "knurl a piston."

Mechanic's Helper Job Title

1. Both groups agreed on only 4 of the 13 competencies in the upper 25 percent. There appeared to be no pattern to the few competencies upon which there was agreement.
2. Both groups agreed on only 6 of the 13 competencies in the lower 25 percent.
3. Although the two groups of respondents disagreed on the order of importance of each of the competencies, there was a rather narrow spread in the weighted scores across all competencies.

Welder Job Title

1. Both groups of respondents agreed on 15 of the 24 competencies in the upper 25 percent. The competencies upon which both groups agreed were those normally considered a part of basic welding. None of the competencies dealt with specialty welding.
2. It was evident by the competencies included in the upper 25 percent that welders needed to be able to operate both arc and acetylene welding equipment.
3. Respondents indicated that 55 of the 97 competencies relating to the job title were not performed in one or more of the businesses surveyed.
4. Both groups of respondents agreed on 20 of the 24 competencies in the lower 25 percent. The competencies upon which both groups agreed were those relating to specialty type welding, often performed outside the dealership.

Painter Job Title

1. Those competencies given the highest rating were related to operating and maintaining spray painting equipment.
2. Competencies relating to cleaning and preparing equipment for painting were given high ratings.
3. Those competencies relating to extensive repair work such as that done in an automotive repair shop were given lower ratings.

Maintenance Man Job Title

1. Both groups of respondents agreed on 5 of the 8 competencies in the upper 25 percent. Four of the competencies agreed upon related to driving and maintaining a truck.

2. The employee respondents felt the actual repair of machinery and equipment was more important to their job than did the other respondents.
3. The other respondents, by their ranking, seemed to feel the maintenance man was most often associated with the delivery of equipment and supplies.

Set-Up Man Job Title

1. Both groups of respondents were in agreement on all competencies in the upper 25 percent.
2. Three of the 5 competencies in the upper 25 percent dealt with the delivery of equipment.
3. The competencies relating to reading a service manual and following directions were given high ratings by both groups of respondents.
4. The employee respondents felt, as indicated by the ratings, that they should have more of a working knowledge of the equipment than did the other respondents.

III

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

The purpose of this section is to present general conclusions, implications, and recommendations based upon the analysis and summarization of data collected.

Conclusions

1. The competencies which the respondents were asked to rate did include the bulk of the tasks which employees in Montana Farm Machinery Dealerships are asked to perform as a part of their job.
2. The employee respondents and other respondents held a divergence of opinion as to the relative value of a large number of the competencies identified with each job title.
3. There was less difference of opinion among all respondents regrading the relative value of those competencies requiring a high level of mechanical skill as opposed to those competencies which involved a large number of people-oriented skills.
4. With the exception of the set-up man job title, the employee respondents and other respondents were in closer agreement on those competencies ranked in the lower 25 percent than they were on those competencies ranked in the upper 25 percent.
5. There appears to be recognizable hierarchy of job titles within Montana farm machinery dealerships with an identifiable group of competencies generally associated with each of the job titles.

6. More emphasis should be given to developing affective type competencies when training potential managers, supervisors, salesmen and partsmen.
7. A sizeable number of the tasks relative to overhaul and repair of farm equipment which require a highly skilled, technically trained person will continue to be performed outside many farm machinery dealerships.

Implications

The survey was conducted to elicit and measure the perceptions of individuals toward a series of selected competencies considered vital to the performance of employees working in farm machinery dealerships in Montana. From the findings of the study the following implications are drawn:

1. The findings will be useful to assist prospective employees assess realistically their qualifications to and interest in performing the tasks associated with employment in a farm machinery dealership.
2. The findings will be useful to teachers and counselors in making career guidance more realistic.
3. The findings will provide a basis for the development of curriculum material utilizing performance objectives.
4. The findings will assist interested persons in developing defensible training programs to prepare potential employees for entry level employment in specific job titles with farm machinery dealerships.

5. The findings should be used in an evaluation of present training programs to determine if the appropriate activities are being included to meet the needs of the prospective employees.

Recommendations

The recommendations for further efforts are drawn from the conclusions, observations and impressions gained while conducting the survey.

For Further Research

1. Additional research is needed to design a new or adapt an existing model for the conduct of a task analysis which will provide a detailed breakdown of all competencies into their respective tasks. Such an analysis should provide insight into any changes regarding competencies that might occur due to changing technology.
2. Research is needed to determine the most efficient and effective way to assure articulation at all educational levels in the preparation of prospective employees. Articulation should relate to:
   a. The identification of common cores of instruction which would serve as a foundation for the preparation of prospective employees.
   b. The minimization of repetition between the secondary school program vocational technical center program and the university program.
3. Translate those competencies identified as important into more teachable tasks. Further professional interpretation will be

needed to isolate what students must know in order to perform those tasks which are identified as being important to the employees success.

For Program Improvement

1. A careful study should be made of existing curriculums designed to prepare employees for farm machinery dealerships to determine if skills related to those competencies the respondents felt were important.
2. A careful evaluation of the existing training programs should be conducted to determine the extent to which present programs are training for those competencies needed in the respective job titles found in the farm machinery dealerships.
3. Future training programs should be based on the satisfactory completion of a series of designated competencies needed for entry level employment rather than on the number of skills that can be completed in a designated time period.
4. Curriculum material should be developed to train persons for each job title identified. Such material should be based on those competencies deemed important by those workers employed in each of the job titles. Every effort should be made to cluster those competencies which are common to all job titles.
5. All curriculum material should be field tested before being distributed. Such material should be made available to those schools considering agricultural education programs prior to the initiation of such programs.

7. Utilize statewide advisory councils when planning new programs or when expanding existing programs, seeking assistance in, (a) locating programs, (b) preparing facilities, (c) obtaining equipment, (d) selecting instructors, (e) developing experience programs, (f) recruiting students, (g) placing students, and (h) establishing evaluation procedures.

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APPENDIX A

RATING SHEET

MONTANA AGRICULTURAL MANPOWER REPORT PHASE II

Answer Sheet for Competency Ratings

Date _____

Interviewer _____

Job Title of Employee Giving Ratings _____

Job Title(s) Being Rated _____

Firm or Ranch _____

Total No. of Employees _____

ID No. _____

INSTRUCTIONS

Enter the competency number on the line and circle the proper number rating the importance of the job task, not the ability to perform the task.

0-No response
1-No importance
2-Some importance
3-Average importance
4-Very important
5-Essential

Comp. No.	Ratings	Comp. No.	Ratings	Comp. No.	Ratings	Comp. No.	Ratings
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5
____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5	____	0 1 2 3 4 5

APPENDIX B

CONTACT CARD

YOUR NAME _____

NAME OF FIRM OR RANCH INTERVIEWED _____

DATE INTERVIEWED _____

NUMBER OF EMPLOYEES INTERVIEWED _____

TIME SPENT DOING INTERVIEW _____

JOB TITLES RATED _____

_____

_____

_____

_____

_____

APPENDIX B

LETTER TO BUSINESSES

Montana State University
College of Agriculture

Agricultural Experiment Station
Bozeman, Montana 59715 Tel. 406-587-3121

Directors Office

We once again request your participation in the Agricultural Manpower Project which is being conducted cooperatively by the Montana Experiment Station and the Office of the Superintendent of Public Instruction.

We again find it necessary to contact you to identify the knowledge, skills and attitudes needed by those employed in your business or farm. We would greatly appreciate your cooperation in rating prepared job tasks.

In a few weeks an interviewer will be contacting you to review the job skills necessary for employment in your enterprise. We hope that the inconvenience and time involved in your cooperation in this effort will be tempered by the fact that the information you provide will be used to help plan Agricultural Education programs in Montana. Hopefully, these programs will provide you in the near future with trained manpower for jobs in agriculture and related fields.

May we express to you our appreciation for your cooperation and the information that you will be providing for us which will benefit our research.

Very truly yours,

J. A. Asleson
Director

JAA:cbm

APPENDIX D

CODE SHEET FOR AGRI-BUSINESS PHASE II

CODE SHEET FOR AGRI-BUSINESS PHASE II

CARD 1

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job title being rated		
Columns 11 and 12	Number of employees		
Columns 13 and 14	Interviewer		
Columns 15 on	Competencies 1-51	Manager	51 comp./card

CARD 2

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 60-100	Supervisor	41 comp./card

CARD 3

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 105-174	Salesman	70 comp./card

CARD 4

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 175-194	Salesman	20 comp./card

CARD 5

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 200-244	Parts Man	45 comp./card

CARD 6

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 250-279	Office Worker	30 comp./card

CARD 7

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting Column 11	Competencies 285-317	Technician	33 comp./card

CARD 8

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 325-394	Mechanic	70 comp./card

CARD 9

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 395-464	Mechanic	70 comp./card

CARD 10

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 465-534	Mechanic	70 comp./card

CARD 11

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 540-591	Mechanic's Helper	52 comp./card

CARD 12

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 600-629	Painter	30 comp./card

CARD 13

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 635-704	Welder	70 comp./card

CARD 14

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 705-731	Welder	27 comp./card

CARD 15

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 740-770	Maintenance	31 comp./card

CARD 16

Columns 1 and 2	I.D. Number		
Columns 3 and 4	Card Number		
Columns 5 through 7	Job title giving ratings		
Columns 8 through 10	Job titles being rated		
Starting column 11	Competencies 775-794	Set-Up	20 comp./card

APPENDIX E

MANUAL FOR INTERVIEWERS

AGRICULTURAL MANPOWER PROJECT

MANUAL FOR INTERVIEWERS

January, 1973

Department of Agricultural and Industrial Education

Montana State University

Bozeman, Montana

Agricultural and Industrial Education
Montana State University
Bozeman, Montana

MANUAL FOR INTERVIEWERS

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MANUAL FOR INTERVIEWERS

This manual was prepared as a guide for interviewers who will be engaged in field contacts with employers and workers, in a study of job competencies in agriculture and agriculturally related areas in Montana. This study is being conducted by the Department of Agricultural and Industrial Education of Montana State University funded jointly by the Office of the Superintendent of Public Instruction and the Montana Experiment Station.

Preparation of this manual is necessary for several reasons. Primarily, certain types of information are deemed important and necessary if the basic objectives of the study are to be realized. An interview instrument has been prepared to insure that all pertinent statements will be covered during each interview. The sequence of the statements in the instrument should be clearly understood by each interviewer. Since several interviewers will participate in the study, some standardization of procedures is necessary to insure comparability of the results.

The interviewer is all important to the success of the study. Your role is a dual one -- you must motivate the respondent to answer each question or statement completely and at the same time be able to measure the adequacy of his responses in terms of the interview objective. The survey has been carefully designed but we must rely on interviewers to get the actual information.

A key concept of interviewing is communication. The interviewer must be able to communicate without distorting the statement designed by the researcher. Learning to interview properly requires extreme sensitivity to the respondent and diligent practice of interviewing techniques. It is important to establish an atmosphere which will maximize the ability of the respondent to communicate.

Success of each interview depends on the ability of the interviewer to create a friendly, permissive atmosphere of mutual trust and confidence when the respondent is first contacted. The first impression made on the respondent is very important for it sets the stage in a manner which will be either beneficial or detrimental to the purpose of the survey. There is not just one way to do this but rather the interviewer must adapt the situation to the differences in people.

In general, the respondent should be made to feel important and that the person being interviewed is doing an important job. He should not feel that answers are wrong or right, good or bad, acceptable or unacceptable. Neither should he be made to feel that being Republican or Democrat, driving a Chevy or a Cadillac, going to church or not, are not equally acceptable. It is imperative that the interviewer be "neutral" in his manner and should not make judgemental comments or indicate attitudes by facial expressions.

It is well to remember that some respondents encountered are so defensive in their personality structure that no amount of effort on the part of the interviewer will lead them to believe anything they say is "all right". As a result, their answers to questions or statements rather than being honest or "true" may be modified to suit a false perception they have of the interviewer brought about by peculiar personality needs.

There is no way of assuring that a desirable atmosphere can be created, therefore, certain principles should be followed which are likely to bring about rapport. As in the case of most principles, they should be used intelligently and adapted to the situation and its needs - the nature of the survey, the characteristics of the respondent, the place of the interview, and so forth.

General Procedure Suggestions

A. Introducing the Survey and Establishing Rapport

1. The interviewer should introduce himself and state the purpose of his call. HELLO. I AM _____. I AM INTERVIEWING PEOPLE WHO WORK IN AGRICULTURE AND AGRICULTURALLY RELATED POSITIONS IN ORDER TO FIND OUT WHAT SKILLS AND KNOWLEDGE ARE NEEDED TO PERFORM THEIR JOBS. THESE JOB TASKS WILL THEN BE STUDIED TO DETERMINE THEIR IMPORTANCE AND WILL SERVE AS A BASIS FOR FUTURE AGRICULTURAL EDUCATION PROGRAMS.

   In addition, the respondent needs to know who is conducting the survey and that the information given will be held confidential.

   THIS STUDY IS BEING DONE BY THE AGRICULTURAL EDUCATION DEPARTMENT OF MONTANA STATE UNIVERSITY IN BOZEMAN SUPPORTED BY THE OFFICE OF THE SUPERINTENDENT OF PUBLIC INSTRUCTION, THE MONTANA EXPERIMENT STATION AND THE AGRICULTURAL COMMITTEE OF THE MONTANA CHAMBER OF COMMERCE. THE INFORMATION YOU PROVIDE WILL BE CONSIDERED CONFIDENTIAL.

   It is sometimes beneficial to tell the respondent how he was chosen to participate in the survey.

   YOUR BUSINESS OR FARM WAS USED IN OBTAINING JOB TITLES FROM YOUR RESPONSE TO OUR STUDY WHICH WAS CONDUCTED LAST YEAR. WE ARE NOW SURVEYING THOSE WHO RESPONDED TO OUR FIRST QUESTIONNAIRE TO OBTAIN THE JOB TASK INFORMATION THAT YOU CAN PROVIDE FOR US. YOUR OWN ANSWERS TO OUR STATEMENTS ARE VERY IMPORTANT TO THE SUCCESS OF OUR STUDY. THE RESULTS OF OUR INTERVIEW WILL HELP DEVELOP PROGRAMS IN MONTANA'S SCHOOLS THAT WILL BETTER FIT OUR YOUNG PEOPLE, AND OLDER PERSONS WHO NEED RE-TRAINING, FOR THE JOB MARKET IN MONTANA.

2. The interviewer must make the respondent feel the interview situation is "permissive" (neutral acceptance). He should show no signs of

approval or disapproval. You have no opinions, feelings or beliefs about the interview answers or the respondent himself. Your job is to help the respondent verbalize his feelings and then record his answers. There are a variety of neutral signs, "uh-huh", "I've got that", "I see" or a simple nod. The interviewer should remain business-like at all times.

3. The interviewer's appearance must be "neutral" and this is important, for appearance is the source of the first impression.
   a. Clothing should be "average" and of the type that is usually seen in the locality where the interview is taking place. It should not be too fashionable or too plain.
   b. Speech should be carefully controlled - not unusual or overly simplified language - "just plain English". Control of intonations and facial and verbal expressions should be exercised.
4. It is best to attempt to obtain an interview at the time of the first call. If this is not possible, you should try to make definite arrangements to obtain the interview at a later time.
   a. "Too busy" is often used as a brush off. If this is the reply, try to arouse the respondent's interest by stating the purpose and the importance of the study. Ask for a definite appointment and be punctual.
   b. If someone answers the call for the respondent who is sick or out of town, give the general introduction to inform him of the purpose of the call. Try to interest the person answering the call so that he can pass the information on to the respondent.
5. The interviewer's approach must be flexible.
   a. The introduction and general content of the interview will have

to be simplified for an illiterate person.

b. If the person is engaged in a task that interests you, express an interest in what he is doing but this must be done sincerely.

B. Choosing the Setting for the Interview

1. It is best to have a quiet, comfortable place.

2. It is a better situation if the respondent can be interviewed alone. The presence of others may alter his responses and bias the interview.

C. Using the Instrument

1. The statements must be asked precisely as they appear on the competency sheets. Rewording must be avoided. This is important to insure balanced responses. Every applicable statement must be asked. (Details of using the forms for the study will be outlined after this general discussion of interviewing techniques).

2. When a statement is not understood, it must be repeated using the same words and not paraphrased. It should be read again, but more slowly. Every statement should be rated. If the respondent is not able to give it a rating, the interviewer should circle "0" denoting "no response". Do not force answers. If any statement is consistently giving the respondents trouble, this information should be turned in to the supervisor.

3. Statements which respondents hesitate or refuse to answer initially must be handled tactfully in order not to destroy rapport.

4. Instruction on the competency sheets for the interviewer must be carefully followed.

5. The instrument must be used informally and with ease. This can only be accomplished by practice. It is best to try to keep an informal

manner and sometimes the understanding of the statements can be enhanced by giving the respondent a copy of the form.

6. Maintaining rapport through the interview is most important. This can be done by taking time to strengthen and re-establish rapport after a "sensitive" question. Assure him of no "right" or "wrong" answers and that his opinions are important.

D. Closing the Interview

1. After the questioning phase of the interview is over, briefly review the instrument in the presence of the respondent to be sure all information has been obtained and recorded. At this time resolve omissions and inconsistencies, if any.
2. Thank the respondent for his participation in the survey and leave him with a feeling that the interview has been a pleasant and interesting experience.

E. Recording Responses

1. Responses must be recorded at the time they are made.
2. The competency ratings must be complete. Do not leave blanks. Remember, every statement should be rated. If the respondent is not able to give it a rating, the interviewer should circle "0" denoting "no response".
3. Significant events during the course of the interview should be recorded -- i.e., major interruptions, emotional reactions, etc.
4. Recorded responses should be made in writing and must be legible.
5. Before the instrument is returned to the supervisor, it must be checked for completeness.

Since our study is concerned with competencies which are the skills, knowledge and attitudes needed to perform certain tasks, perhaps you will be interested in looking over the competencies compiled for interviewers.

For your own information, perhaps you might like to rate the importance of these competencies on a scale similar to the one you will be using when out in the field.

COMPETENCIES FOR INTERVIEWERS

Circle One - - - - - -

Has the ability to:	NO RESPONSE	NO IMPORTANCE	SOME IMPORTANCE	AVERAGE IMPORTANCE	VERY IMPORTANT	ESSENTIAL
1. Remember details and names.	0	1	2	3	4	5
2. Write clearly.	0	1	2	3	4	5
3. Record data conscientiously.	0	1	2	3	4	5
4. Relate to all social classes and function in an unstructured situation.	0	1	2	3	4	5
5. Approach total strangers and participate in a wide variety of small talk.	0	1	2	3	4	5
6. Make the informant feel at ease.	0	1	2	3	4	5
7. Structure one's role in a realistic non-threatening way.	0	1	2	3	4	5
8. Keep the ultimate objectives of the research project in mind while interviewing.	0	1	2	3	4	5
9. Pick up quickly the technology common to the organization or community in which one is working.	0	1	2	3	4	5
10. Keep from probing into problems he or the respondent can't handle.	0	1	2	3	4	5
11. Be warm enough so that people will want to talk, but not so hot or pressing that he becomes a threat.	0	1	2	3	4	5

Certain characteristics can better be classified as personal qualities:	NO RESPONSE	NO IMPORTANCE	SOME IMPORTANCE	AVERAGE IMPORTANCE	VERY IMPORTANT	ESSENTIAL
12. Humility, modesty, integrity, respect, sympathy, curiosity about people and the subject.	0	1	2	3	4	5
13. Insight, patience, fortitude, wonder, sincerity, sincere appreciation of people.	0	1	2	3	4	5
14. Ability to make a good first impression. Neither too much the "native" nor too much the "outsider." The ability to look "different" from the native in a way one is expected to look.	0	1	2	3	4	5
15. Open friendliness rather than withdrawn curiosity.	0	1	2	3	4	5
16. Ability not to be resentful at unfavorable field situations.	0	1	2	3	4	5
17. A person whose thinking tends to run off in a great many directions and who seeks out widespread implications, rather than a person who has a clearly, highly organized mind.	0	1	2	3	4	5
18. Should be able to respect others customs, habits, and mannerisms and values.	0	1	2	3	4	5

APPENDIX F

BUSINESSES CONTACTED

I.D. NO.	BUSINESS	TOWN
01	Anderson Implement	Cut Bank
02	Bedord Equipment	Missoula
33	Big Red	Kalispell
17	Billings Ford & Tractor	Billings
03	Chester Implement	Chester
04	Chinook Equipment	Chinook
05	Choteau Implement	Choteau
06	Davies, Inc.	Missoula
07	Day Equipment Co.	Kalispell
08	Dutton Machinery Co.	Dutton
09	Eaves Equipment	Havre
10	Farm & Ranch Equipment	Great Falls
11	Farm Equipment Sales Co.	Glasgow
12	Five Valley Implement	Missoula
13	H & H Implement	Choteau
14	Hass & Assoc. Implement	Fort Benton
15	Horizon Equipment	Miles City
16	Horning Implement Co.	Lewistown
18	International Harvester	Great Falls
37	Kellion-Moore	Great Falls
19	Marias Equipment	Chester
20	Miles & Ulmer	Hardin
21	Milne Implement	Glendive
22	Moe Motor Co.	Wolf Point

I.D. NO.	BUSINESS	TOWN
23	Moodie Implement Co.	Lewistown
24	Musick Implement Co.	Denton
25	Musselshell Valley Equip.	Roundup
26	Nash Implement	Redstone
27	Pehl Implement	Whitehall
28	Rasmus Nelson Implement	Scobey
29	Stedje Bros.	Ronan
30	Taylor-Smith, Inc.	Glasgow
31	Thielman Implement, Inc.	Chester
32	Tiber Tractor Co.	Chester
34	Triple A Implement	Sidney
35	Valley Implement	Glasgow
36	Valley Machinery	Havre
38	Western Implement	Plentywood
39	Westmont Tractor	Missoula
40	Wolf Point Implement	Wolf Point